



Vol. XXXVI

OTTAWA, ONT.

January, 1922

3676 2/12/22
Publications Committee
7 Feb 42

The Canadian Field-Naturalist



Published by
The Ottawa Field-Naturalists' Club

ISSUED MARCH 11TH, 1922

(Entered at Ottawa Post Office as Second Class Matter)

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VOLUME XXXV. OF THE CANADIAN FIELD-NATURALIST

Owing to a strike on the part of the printers and to other causes beyond the control of its Editor, Volume XXXV. of *The Canadian Field-Naturalist* has not yet been completed. Numbers 7 to 9, inclusive, will appear in one issue, which is now in press. A change in the place of publication from Gardenvale, Quebec, to Ottawa, Ontario, makes it possible for this first number of Volume XXXVI. to be published without waiting for the close of the previous volume, although the usual cover-design must be dispensed with until Volume XXXV. is completed.—EDITOR.

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THE CANADIAN FIELD-NATURALIST, lately THE OTTAWA NATURALIST, established thirty-five years ago, "to publish the results of original research or investigation in all departments of natural history," is issued monthly, excepting for the months of June, July and August.

Papers, notes and photographs should be addressed to the Editor. Manuscript should be typewritten.

Subscriptions cover the current year, except those taken out during last quarter, when they will be applied on the following year, the remaining numbers of current year being sent free. Payments should be made to the Treasurer, Mr. C. B. Hutchings Entomological Branch, Dept. of Agriculture, Ottawa. Price of this volume, \$1.50; single copies 20c each.

The Canadian Field-Naturalist

VOL XXXVI

OTTAWA, ONT., JANUARY, 1922.

No. 1

THE BAND-TAILED PIGEON IN BRITISH COLUMBIA.

BY J. A. MUNRO, OKANAGAN LANDING, BRITISH COLUMBIA.

The Band-tailed Pigeon has achieved celebrity through its relationship with the extinct Passenger Pigeon. Together with the Mourning Dove, it shares the distinction of being the only Canadian kin of their illustrious connection and the periodic newspaper stories of Passenger Pigeons surviving in the West have always been traced to one of these species. In reality the Band-tailed Pigeon has little resemblance to the extinct species except in its feeding habits and game qualities.

The adults of both sexes are alike although there is considerable individual variation; head and under surface of body vinaceous drab,* becoming richer on the chest and crown and fading to light gray on the throat and to white on the abdomen; back deep mouse gray, slightly glossed with iridescent olive in some specimens; a patch of iridescent green margined with a white collar on back of neck; upper surface of folded wing, rump, and base of tail clear Paynes gray; deepening to dusky neutral gray near middle of tail, the darker color forming a black band in sharp contrast to the pale mouse gray on terminal third of tail feathers; flight feathers *chætura* black with white line on margin of outer web; feet orange; bill orange with terminal third black; naked eyelids light jasper red; irides rose doree with inner ring of silver. The juvenals are sombre editions of their parents, lacking the iridescent patch and white collar on back of neck and with the vinaceous drab replaced by deep mouse gray; in some individuals with drab feather tipping giving a stippled effect; feet mars yellow or clay color; bill similar with terminal third black; naked eyelids and irides violet plumbeous, the latter with inner ring of fuscous. In flight or when clustered in the tall dead trees they appear quite dark—almost black—and when feeding on the ground, slate blue is the dominant color.

The summer range of the Band-tailed Pigeon is from south-western British Columbia through western Washington, western Oregon to California,

Mexico and Nicaragua and eastward to portions of Colorado, western Texas and Arizona. In the southern part of their range their migrations are chiefly zonal; they winter in the Transitional Zone and breed in the higher altitudes. Middle California is the northern limit of their winter range and probably the winter home of British Columbia, Washington and Oregon birds. In Canada their distribution is over a relatively small area, being restricted to southwestern British Columbia west of the Cascade Mountains, including Vancouver Island and the Gulf Islands, and here they are known only as summer residents.

Early in May when seeding has commenced in the fertile Fraser Valley, pigeons make their initial appearance; first a small band is noted (with a thrill of interest if the observer be a bird-lover and with disgust tempered by resignation if he be a farmer), then larger flocks appear, and finally comes an invasion. While their arrival from the south is at approximately the same time each year, their appearance in any given locality is uncertain and the size of the flocks variable. Large numbers may visit a district for a few days or only small bands may appear and in adjacent areas of the same type they may not be seen at all. For example, in the spring of 1920 they were very plentiful on Sea Island and Lulu Island. The following year few were seen there and in the Boundary Bay districts thirty miles distant, farmers were complaining of the great flocks that were feeding on their seed grain. During some years they are locally abundant in the spring and scarce in the fall, or vice versa. In the years when they do come in large numbers, farmers insist that their appearance is coincident with seeding operations.

For possibly three weeks after their arrival they remain in flocks and their vagrant wanderings during this period follow no known laws. Nesting begins early in June and the large flocks are then broken up. There are, however, small flocks always in evidence, presumably males and non-breeding birds, and at this time they are seen less

*The 1921 edition of Ridgway's Color Standards and Code for Nomenclature is used in this description.

about the fields and more frequently in the timber. Few nests of the Band-tailed Pigeons have been found in British Columbia, indeed, the discovery of a nest even in the Western United States where so many ornithologists are in the field is deemed worthy of special record. A discussion of their nesting habits, however, does not come within the scope of this article; suffice it to say that they do not breed in colonies as did the Passenger Pigeon, and that their solitary nesting has been the chief reason for their continued existence. Like the Passenger Pigeon, only one young is raised by each pair in a year. Early in August, when the young are full grown, they once more gather in flocks and forage in the woods and fields until their departure in September. There seems little doubt that the protection afforded this species under the Migratory Birds Convention has been the cause of a considerable increase in British Columbia. Some settlers who have taken up land within the past ten years are under the impression that their appearance in British Columbia is a recent one—another of nature's aggressions—while old-timers recall early days when their number was legion. A resident of Saanichton, Vancouver Island, informed me that during 1911 only one pair of pigeons was seen on his farm of eight hundred acres; that in subsequent years they appeared in varying numbers at different seasons but were not considered a menace to crops until the spring and autumn of 1919.

Pigeons arrive in British Columbia when their natural food is at its lowest ebb. It is supposed that before the days of agriculture in this province, they subsisted entirely on what dried berries, seeds, cherry stones, acorns, etc., could be discovered under the fallen leaves in the forest, probably eked out by buds and tender leaves. When in later years they found grain-planted clearings in the timber where once they had foraged industriously for a scant sustenance, it is natural to suppose that this highly concentrated food offered in abundance during a season of scarcity should have exerted a marked influence on their feeding habits. Grain-eating probably has become more of a racial habit in the northern birds than in those that breed farther south, owing to the fewer indigenous varieties of seed and berry producing plants found in the north. Contrasted with California's wealth of oaks, manzanitas, madrones and other fruit-bearing trees, British Columbia is relatively poor in such food. The oak, for example, is restricted to a small portion of Vancouver Island.

Assuming that birds follow the migration routes of their ancestors, it follows that the

pigeons now breeding in British Columbia are of British Columbia extraction and have had little commerce with, for instance, those resident in California, where their migrations are chiefly altitudinal. It is thought that individuals, or groups of individuals, among many species of birds develop certain habits in harmony with their environment and that these habits persist in their descendants even though they are foreign to the species as a whole. Under some conditions Blackbirds and Robins become habitual fish-eaters, yet fish-eating is not a racial habit. The Loon in the northern lakes of Ontario feeds on mullet and *Cyprinoids* and is apparently designed for the delight and edification of tourists; in the mountain lakes of British Columbia he is a trout-eater, a duck-killer, and is execrated by sportsmen. On the prairie the Mallard fattens in the grain fields, on Vancouver Island he grows rank on a diet of rotten salmon; the list could be extended indefinitely. That species are not a fixed quantity but undergo various physical modifications due to climatic and topographical conditions is an axiom of modern science. That there frequently are important modifications of their feeding habits as a result of peculiar local conditions is not so generally recognized; at least no emphasis is laid on this point in the current literature of economic ornithology. The point I am trying to make is this; the economic status of the Band-tailed Pigeon in British Columbia is a problem for our own solving and our conclusion must be based on the results obtained from field work in this province.

In the spring and autumn of 1921, while gathering data on this question, I interviewed a number of farmers in the pigeon districts. All were agreed that pigeons were responsible for a great deal of damage, but their opinions regarding the nature of this damage were greatly at variance. In one district I was told that pigeons took only seed grain when newly planted; in another district they were said to do the most damage to sprouted grain. Farmers in other districts stated that little damage was done in the spring but that in the late summer they attacked the stooked grain while in still other districts I was informed that only fruit was taken in the autumn but that their damage to newly planted crops frequently entailed a second sowing. Taking into consideration the erratic nature of the species I am inclined to think that all these opinions are more or less correct.

It is thought that under ordinary conditions the amount of seed wheat, oats, or barley taken by pigeons has little effect on the harvest. Early in June, I examined a ten acre field of wheat ove

which about one hundred pigeons had fed until the seed sprouted. The plants were then two inches high and no evidence of damage could be found. In August I examined this crop again and it appeared to be of normal proportions. Pigeons when feeding over a newly planted field take only the surface grain. The amount of seed available would depend on the care taken in sowing; if sown broadcast on newly ploughed land and then harrowed in, as sometimes is done, a larger percentage of seed would be exposed than when a drill had been used. Whether the loss of this grain is of importance or not is a matter for agricultural experts to decide. I have received emphatic statements to the effect that surface grain germinates and matures, and equally emphatic denials of this. Be that as it may, there is no question regarding the amount of grain pigeons are able to consume. Their crops are capable of enormous distention and will hold at least a half-pint of grain. Under exceptional conditions such as the exposure of a large percentage of seed by heavy rains the loss through pigeons might entail a second sowing.

When about to feed they usually arrive on the scene in flocks of open formation with many stragglers in the rear and first alight in the adjacent trees. Tall dead firs or cedars are always favorite perching trees. In a short time they descend to the ground, not in a body, but in detachments. Systematically they work across the fields, those in the rear constantly flying over those in front to reach fresh ground. A number of birds are always in the air and the flock, advancing rapidly, soon reaches the edge of the crop. At all times they are wary and frequently will rise suddenly from a field for no apparent reason. Their habit of alighting in trees before commencing to feed is probably the reason why fields surrounded by timber, or those in which isolated trees have been left standing, are selected for their concentrated attacks.

After the grain has sprouted, they usually leave for freshly planted fields, if such be available. If not, it is likely that further damage will be caused by their pulling out the sprouts. I have not seen instances of this but have it on good authority that such damage does occur. It is also claimed that at this time pigeons scratch to uncover the seed, but this is a matter that will require investigation.

From the time seed is planted until the grain is harvested a crop is subject to many factors that may reduce the yield, therefore it is a difficult matter to estimate the reduction due to the presence of pigeons in the spring. The extent of their damage to stooked grain on the other hand

is readily computed. The presence of pigeons on the stooks is conclusive evidence that they are lessening the farmer's profit by every kernel consumed, and to reckon the extent of such loss merely requires that the number of pigeons present be multiplied by the average crop contents of a few birds and the result reduced to dollars and cents on a daily per capita basis. For some obscure reason they often select a particular field of stooked grain for their operations and pass by identical fields in the immediate vicinity. They return here day after day and when the crop is threshed glean the waste grain among the stubble even when a more abundant supply is available on adjacent fields.

No complaints have been received of pigeons attacking standing grain and their damage to grain in the stook is confined to certain areas. No doubt this is largely governed by the abundance or scarcity of wild fruit. The species of fruit chiefly eaten are *Cascara Sagrada*, *Rhamnus purshiana*; *Arbutus*, *Arbutus menziesi*; *Salal*, *Gaultheria shallon*; *Dogwood*, *Cornus nuttallii*; *Choke Cherries*, *Prunus*, and *Elderberries*, *Sambucus*. On Vancouver Island acorns also form an important item in their food supply.

In the spring pigeons seem to prefer peas to any other food. As they pull up the young plants as well as take what seed has been left on the surface, serious damage to the crop may result if a large number of birds are present. A seventeen-acre field of peas, examined in May when the plants were two inches high, contained several areas forty to sixty yards in circumference, where pigeons had been feeding. At a distance these areas stood out as black patches against the prevailing green and a closer examination showed that two-thirds of the plants had been thinned out. While I was examining this field through binoculars, a flock of about fifty birds alighted in one of these patches and commenced feeding. As I started to approach, they flew off in a long straggling flock, headed for the distant timber. If peas and grain are sown together the peas will be taken in preference to the grain. In the latter part of August I examined a crop of oats, barley, wheat and peas that had been grown for chicken-feed. Pigeons had fed over this field shortly after it was planted and the owner claimed that practically all the peas had been taken. Examination of the stooks seemed to corroborate his statement as very few pea vines could be found.

When studying Band-tailed Pigeons in the field one is impressed by their splendid game qualities. Their flight is vigorous and sustained and they are wary at all times. If they are surprised in the timber their departure is noisy and abrupt and

with a burst of speed that soon takes them out of shot-gun range. It is usually impossible to approach within range when they are feeding in the open, neither will they allow a close approach when they are in the perching trees. When pigeon-shooting was legal, a common practice of the hunter was to hide under a favorite perching tree and shoot the birds as they alighted. Many of these trees were dead giants, their tops high above the green timber, and as pigeons usually chose to settle on the topmost branches, the shooting was done chiefly with a 22 calibre rifle.

Sometimes good shooting was had by the use of a blind and dead birds for decoys, and in some places the conditions were suitable for flight shooting. No matter how they were hunted a good bag tested the resources of the hunter. That this fine game bird will be preserved for future generations of sportsmen is indicated by their phenomenal increase during the past four years and incidentally this furnishes proof that the international protection of Migratory Birds is entirely effective.

CANADIAN SPHAERIIDAE.

BY THE HON. MR. JUSTICE LATCHFORD.

(Continued from Vol. XXXV, p. 70)

PISIDIUM

In 1821 Carl Pfeiffer established this genus to designate a group of the *Cycladidae*, as the *Sphaeriidae* were then called, which had but a single siphonal tube, and that, as he thought, at the anterior end of the shell. The syphon, however, projects from the end of the shell which is opposite to that from which the foot is protruded. Pfeiffer's error is due to the fact that the shell itself is shorter behind than in front of the beaks—a character which with the single siphonal tube distinguishes *Pisidium* from *Sphaerium* and *Musculium*.

The genus abounds throughout Canada. It occurs in great numbers in almost every pond and in the quieter waters of many of our lakes and rivers. From the clear cold streams in the Laurentian Hills it is usually absent, but it is found in every brook and ditch on the south side of Ottawa. The shells must be sought by sifting. They are invariably sunk in the sand or mud, and certain forms inhabit very deep water. As some do not exceed a millimeter or two in diameter a dredge with a very fine mesh should be used by the collector.

The *Pisidia* present exceptional difficulties in identification. The soft parts of species differing widely in external appearance are so similar that they have up to the present afforded no characters of value to the diagnostician. Externally the form or size of the same species is sometimes modified by varying conditions. The characters mainly relied on by systematists are those presented by the hinge teeth, which are complicated in structure and arrangement. They are fairly constant in any one species and different in every other species. It is on the details of the hinge

that Mr. B. B. Woodward particularly relies in his monograph on the British and Irish *Pisidia* in the British Museum. (Catalogue of Species of *Pisidium*, Longman's, 1913.) His method is too technical to be more than mentioned here. Applying it with great labour and the utmost precision to the vast collections available to him he has reduced the number of species found in Great Britain and Ireland to seventeen, three of which are known only as fossils. His monograph with its thousands of figures is a monument to his industry and skill.

When the hinge teeth are considered in connection with external characteristics they seem to afford the best means of distinguishing one species from another. Yet so great are the difficulties presented in identifying all but a few of the genus found in Canada that I have been constrained to rely almost wholly on the judgment of Dr. Victor Sterki of New Philadelphia, Ohio, who has made these shells the subject of intensive study. He has accumulated material in vast quantities from all over the continent, and examined the collections in the National and other United States Museums, including what are supposed to be the type specimens of the earlier writers. In his Preliminary Catalogue, to which I have frequently referred in previous papers, he enumerates no less than one hundred and thirty species and varieties from Canada and the United States. In his monograph of the *Pisidia* on which he is now engaged there will doubtless be modifications of this list. In the meantime I follow it, and all identifications of shells which I have collected are given upon his high authority. His descriptions of new species are repeated with his permission.

But few shells of the genus were collected in the early years of the Club's activities. Heron's list

(Trans. 1, p. 40) contains only four species, two of which were not positively identified. Another species was added in the Report of the Conchological Branch, read March 13, 1890, and prepared by the writer and the late Rev. Geo. W. Taylor, which gives a catalogue of all the molluscs then known to be found in the vicinity of Ottawa. The success attending Roper and Winkley in Massachusetts and Maine and the encouragement extended by Dr. Sterki induced me to devote special attention to this genus. The result was that in my Preliminary List of Sphaeriidae published in *The Naturalist* in 1913, I enumerated twenty-three species of *Pisidia*, several of which were considered new. Since then I have added several others and the field is by no means exhausted. So numerous are the localities in which the shells occur that many other species and varieties must remain undiscovered.

33. *PISIDIUM VIRGINICUM* Gmelin.—Heron found this shell on the beaches of Kettle Island exposed at low water. My only specimens were obtained in a similar situation lower down the Ottawa, and by dredging in the pond, prolific in small molluscs, on Duck Island—near the south end. With the

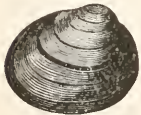


FIG. 6
P. virginicum, X 2 exception of *P. idahoense*, which has not been found in Ontario or Quebec, it is the largest known species, attaining frequently a length of 8 mm. It appears to be quite active and makes long and distinct furrows in moving. When mature it is always of a dark brown color near the umbones.

Mr. A. D. Robertson found *P. virginicum* abundant in sandy channels in the Georgian Bay (Contributions to Canadian Biology, Fasc. ii, 107), but appears not to have noticed there any other shell of the genus. The species has a wide range in the United States east of the Rocky Mountains, and extends even into Alaska and Yukon.

34. *PISIDIUM IDAHOENSE* ROPER. This shell ranges from Idaho westward to Washington and northward through British Columbia into Yukon. East of the Rockies it is found in the United States only in Michigan. Farther east it is not known to occur except in Prince Edward Island where it was found by Mr. C. Ives. This gentleman began the study of the mollusca after attaining the age of three score years and ten, and then became an indefatigable collector, especially of the smaller marine forms like *Odostomia*, discovering several previously unknown. It is a matter of profound regret to many that impaired vision has prevented a continuance of his fruitful labors. Other *pisidia* found by him near his home are

compressum, *abditum* and *variabile*. His sendings of *P. idahoense* from a pond near the east end of Prince Edward Island are identical in every characteristic with co-types received many years ago from Mr. Roper. The shell is of great size in comparison with the largest other species of the genus. I have several specimens from Mr. Ives which exceed 18 mm. in length.

35. *PISIDIUM VARIABLE* Prime. This species occurs in great numbers in many places near Ottawa. One such locality where no other member of the genus is found is a ditch running east and west on the Shouldis farm on Carling Avenue, south of the wood lot. When mature it is but slightly smaller than *virginicum* and never as dark in color. The shell is solid, inflated, inequilateral and oblique. The umbones are greatly elevated, full and prominent. In the vicinity of Toronto it is quite a common shell and is among the species collected by McInnes in the Attawapiscat.

36. *PISIDIUM COMPRESSUM* Prime. No shell of the genus is more common than this in the vicinity of Ottawa. It abounds in Hemlock Lake especially near the south-west angle where the banks of marl reach to the water's edge, and living molluscs form their shells from the remains of ancestors long dead. In Nepean it is found in Cave Creek and on the Magee and Shouldis farms; in the Ottawa on the shoals above Britannia pier; at Cornwall in the canal; in Lake Erie at Port Ryerse; and near Toronto at Richmond Hill and in the Etobicoke. On the Quebec side of the Ottawa it occurs in Chilcott Lake, near the outlet from the orchid swamp.

37. *PISIDIUM COMPRESSUM PELLUCIDUM* Sterki. At one time Dr. Sterki regarded this shell as entitled to specific rank. In his Preliminary Catalogue, however, he treats it as a variety of *compressum* from which it differs in size, being smaller. It is also less high, the beaks are less pointed; surface with lighter stripe, shell translucent.

38. *PISIDIUM SPLENDIDULUM* Sterki. A few small shells from Magee's Creek south of the Richmond Road (my No. 2547) are thought to belong to this widely distributed and variable species. It is desirable that additional specimens should be obtained. None could be found in the summer of 1921 on the only occasion on which I collected in this stream.

39. *PISIDIUM GLABELLUM* Sterki. Shells from the stream south and west of Graham Bay Station which I sent to Dr. Sterki in 1911 (his No. 6812) are referred to in his description of *P. glabellum* (*Nautilus*, XXVI, 137). He considered them attributable to the new species though somewhat

different in shape, having the superior margin more curved and the beaks narrower and more elevated. The types are from Hess Lake, Mich., but the species has a wide distribution from New England to Pennsylvania and Minnesota. It is described as having resemblance to small forms of *splendidulum*. The hinge is markedly strong and like that of *variable* and *compressum*.

40. *PISIDIUM ABDITUM* Haldeman. Many forms now regarded as distinct were formerly thought to belong to this species. Dr. Sterki examined the authentic specimens, seven in number, from the Temple Prime collection. He states (*Nautilus*, XXVI, 6) that the description in Prime's Monograph of the Corbiculidea is quite inadequate even with respect to the form of the shells assumed to be the types, and that there are several geographical subspecies. I have found what Dr. Sterki regards as true *abditum* in Dow's Swamp and in a pond near Casselman. Heron does not, I think, give the locality in which he found the shells doubtfully assigned to this species.

41. *PISIDIUM SPHAERICUM* Sterki. Among a lot of shells collected at the extreme end of Gore Bay in the Manitoulin Islands was an almost globular *pisidium* which Dr. Sterki recognized as identical with a species known to occur from Maine to Virginia and long confounded with *abditum*. He described it in *The Nautilus*, XXIV, 8. It is stated to be easily distinguishable from larger forms of *abditum* by the large and prominent beaks situated close to the posterior end of the mussel, and the strong hinge. Average proportions are 100; 90; 76. My shells are all less than 5 mm. in length.

42. *PISIDIUM ADAMSI* (Prime) *AFFINE* Sterki. When Dr. Sterki described *P. affine* (1901) (*Nautilus*, XV, 66), he had seen no specimen of *adamsi*, and from the description of the latter species considered that the two were distinct. After examining the specimen of *adamsi* in the Prime

collection he concluded that the two were specifically identical. The only *affine* I have found were procured in the large pond on the Metropolitan Electric Company's property, south of the Des Chenes Rapids.

43. *PISIDIUM NOVEBORACENSE* Prime. A wayside ditch between the third and fourth concession of Nepean, east of Fallowfield, was found to contain this shell in large numbers. It doubtless occurs in many other localities. Several varieties have been described by Dr. Sterki. The more typical form is thought to be that which is found in spring brooks.

44. *PISIDIUM ELEVATUM* Sterki. A streamlet formed by the overflow from springs in the Bell gravel pit near Britannia at one time afforded many examples of this shell. None could be found in the summer of 1921—perhaps owing to a lack of diligence on the part of the seeker after specimens. Dr. Sterki was disposed at first to consider the shells a variety of *noveboracense*, but in his catalogue lists it as distinct. I have found it only in the locality mentioned.

45. *PISIDIUM SUBROTUNDUM* Sterki. Though but recently recognized as distinct, this shell was long unnamed or doubtfully referred to other species. It has a wide distribution in Canada, being found from Jupiter River, Anticosti, to the Albany and Attawapiscat rivers in north-western Ontario, where it was found by Mr. McInnes. It is doubtless the unnamed *pisidium* from the Attawapiscat river referred to in report of the Bureau of Mines for 1912.

Near Ottawa the shell has been found in Dow's Swamp and in a spring on the Hare farm in Nepean. On the north shore of Lake Huron near Cutler a few specimens were obtained in a ditch beside the railway, north of the Indian village of Kashaboiwe.

(To be concluded.)

THE FRESH WATER LEECHES (HIRUDINEA) OF SOUTHERN CANADA

BY J. PERCY MOORE

Hitherto little has been published relating to the distribution of leeches in the Canadian Provinces and that little has been limited practically to the Great Lake shores of the Province of Ontario. The leech fauna of the latter region is fairly well known, especially since the publication of Miss Ryerson's paper on the extensive collections made in Georgian Bay under the auspices of the Dominion Biological Station and of Toronto University. This enumerates seventeen species

in all. Twelve species, of which specimens were actually taken on the Canadian shore of Lake Erie, are listed in my own paper on the Hirudinea and Oligochoeta of the Great Lakes region. Earlier records from the Canadian side of the Great Lakes are by Verrill and Nicholson. Baird has described a single species from Vancouver and one from Great Bear Lake and here and there in the narratives of exploring expeditions and travelers in Canada casual references to the

occurrence of leeches are made.

For this reason the opportunity was welcomed of examining a small collection of leeches in the Victoria Memorial Museum (Ottawa), for which I am indebted to Mr. Fritz Johansen. The present paper presents these determinations, with transcripts from the labels (in quotation marks) of all specimens, so that all of the locality data may be specifically recorded. To these is added a list of leeches from Canadian localities in the collection of the Academy of Natural Sciences of Philadelphia. These are designated A. N. S. and include some of the material on which my paper referred to above was based.

The general result of this study is to establish that most of the leeches found in the fresh waters of the northern United States are distributed through the southern provinces of Canada. It is now possible to trace several species throughout the entire east and west width of Canada. It still remains to fix the northern limits of the range of most species, for there are practically no records except from the southern tier of provinces. That leeches abound in the numerous lakes of central and northern Canada may be expected. Several collections that have come to me from Alaska establish their occurrence in the far north, but these are reserved for description elsewhere. No species distinct from those known in the northern United States exists in the collection. A new subspecies is described but this has been known to me from several points in the northern states for about twenty years.

The following key will serve for the identification of the species listed:

I. Mouth a small pore-like opening in the disc of the anterior sucker through which the muscular pharyngeal proboscis may be protruded; no jaws. *Rhynchobdellae*.

A. Body not divided into two regions; usually much depressed; eyes near median line; stomach usually with well-developed lateral caeca; complete somites triannulate. Family *Glossiphoniidae*.

a. Genital orifices separated by a single annulus; size small.

b. Eyes one pair, distinct; gastric caeca few and simple.

1. A brown cuticular nuchal plate and underlying gland on the dorsum of somite VIII; body capable of great extension; cutaneous papillae obsolete; color pale:—pink, gray or brownish. *Glossiphonia stagnalis*.

2. No nuchal plate or gland in the adult; body relatively broad and flat, incapable of great extension; cutan-

eous papillae few but variable in size and number; color brownish, either deeply pigmented in narrow longitudinal lines or diffuse with transverse rows of metameric white spots on the middle annuli of complete somites. *Glossiphonia fusca*.

bb. Eyes three pairs, arranged in three groups of two in a triangular figure; gastric caeca six pairs, very slightly branched.

3. Body broad and flat, moderately extensible; transparent, with little pigment. *Glossiphonia heteroclita*.

aa. Genital pores separated by two annuli; size medium or, for the family, large.

c. Eyes three or four pairs, all distinct, in two nearly parallel rows; size medium.

4. Eyes three pairs; body rather thick, incapable of great extension or flattening; opaque, usually heavily pigmented with brown, a dorsal and a ventral pair of narrow dark brown longitudinal lines for nearly the entire length, the former usually interrupted by pale metameric spots; gastric caeca seven pairs, little branched. *Glossiphonia complanata*.

5. Eyes four pairs; body thin and soft, capable of great extension; transparent, lightly pigmented with green and three series of small pale yellow spots; gastric caeca nine or ten pairs, moderately branched. *Proclepsis occidentalis*.

cc. Eyes one pair, far forward, compound, fused in a common pigment mass; gastric caeca seven pairs, much branched. *Placobdella*.

d. Caudal sucker with numerous minute marginal papillae; size medium or small.

6. Moderately depressed, slender anteriorly; dorsal papillae usually in a median and two paired series, small but prominent and pointed. *Placobdella phalera*.

dd. Margin of caudal sucker smooth; size large.

7. Body very broad and much depressed; dorsal papillae few, low and smooth; integuments opaque; deeply pigmented in a conspicuous pattern of olive green and yellow. *Placobdella parasitica*.

8. Body very much depressed; dorsal papillae numerous, pointed and rough; integuments translucent; deeply pigmented in an irregular mixed pattern in which brown predominates. *Placobdella rugosa*.

AA. Body more or less distinctly divided into an anterior narrower and a posterior broader region, little depressed; eyes when present usually well separated; complete somites usually with more than three (six to fourteen) annuli; stomach usually with only a posterior pair of caeca which are more or less coalesced.

Family *Ichthyobdellidae*.

Unrepresented by any species in this collection.

II. Mouth large, occupying entire cavity of sucker; pharynx not forming a protrusible proboscis; jaws often present. *Gnathobdellae*.

B. Eyes five pairs, arranged in a regular arch on somites II-VI; complete somites five-ringed; muscular jaws usually with teeth present; genital organs highly complex; testes strictly paired (usually nine or ten); stomach with at least one pair of spacious caeca; size large. Family *Hirudinidae*.

e. Jaws prominent; teeth numerous, in one series; caeca along entire length of stomach.

9. Teeth about sixty-five on each jaw; genital orifices separated by five annuli; copulatory gland pores on somites XIII and XIV; penis short and conical; color dark green above, orange below, the dorsum with metameric median bright red and lateral black spots. *Macrobodella decora*.

ee. Jaws rather small and retractile into pits or obsolete; teeth when present few and coarse and in double series; caeca limited to a posterior large pair, the others vestigial; genital orifices separated by five annuli; no copulatory glands; penis filamentous.

10. Jaws well developed, each bearing twelve to sixteen pairs of coarse teeth; color variable, green or brown and marked more or less thickly with very irregular non-metameric, usually confluent dark blotches. *Haemopsis marmoratis*.

11. Jaws vestigial, no teeth; color similar to 10 but the venter pale and the spotting generally sparser, coarser, more angular and less confluent; very large. *Haemopsis grandis*.

BB. Eyes three or four pairs (rarely absent), usually one or two pairs on II and two pairs at the sides of the mouth on IV; complete somites five-ringed or more; no jaws; no gastric caeca; genital organs relatively simple; testes numerous, small, unpaired; size medium. Family *Erpobdellidae*.

f. Somites five-ringed; none of the annuli conspicuously enlarged or subdivided.

12. Genital orifices separated by two annuli; atrial cornua simply curved; vasa deferentia reaching forward to ganglion XI; eyes three pairs, the first largest; color pattern generally conspicuously longitudinally striped. *Erpobdella punctata*.

13. Like 12 but color pattern more or less strongly annular. *Erpobdella punctata annulata*.

ff. Last annulus (f. 6) of complete somites obviously enlarged and subdivided; eyes usually four pairs.

g. Atrial cornua spirally coiled.

14. Genital orifices separated by two annuli; vasa deferentia reaching forward to ganglion XI; color pattern plain or irregularly blotched with black. *Nephelopsis obscura*.

gg. Atrial cornua not spirally coiled but short and simply curved.

15. Vasa deferentia with loops reaching forward to ganglion XI; genital orifices separated by three and one-half annuli; eyes four pairs; nearly pigmentless. *Dina parva*.

16. Vasa deferentia not extending anterior to atrium; genital pores separated by two annuli; eyes three or four pairs; pigment absent or in scattered flecks. *Dina ferrida*.

GLOSSIPHONIDAE

Glossiphonia complanata (Linnaeus)

"Alexandria Bay, Thousand Islands, N.Y., September 1, 1919. F. Johansen." One specimen.

"On stones in Fairy Lake, Hull, Quebec, May 5, 1918. F. Johansen." Two specimens. Besides the usual three series of marginal, intermediate and paramedian dorsal white spots there are a few scattered white spots.

"Ottawa River, near Hull, Quebec, October 13, 1918. F. Johansen." Four specimens with *Dina parva* and *Erpobdella punctata*. Dorsally these specimens are curiously mottled and sometimes reticulated with brown and white, and the brown lines broken into segments by regular white spots. Ventrally they have a greenish hue.

"In ditch at Ottawa (West), Ontario, November 10, 1918. F. Johansen." One specimen.

"Stream near Chelsea Road, Hull, Quebec, May 9, 1920. F. Johansen." Three specimens. Two are dark, with continuous black paramedian lines, the other paler and mottled, with the paramedian lines broken into a series of spots by pale blotches.

"Loch Lomond (near St. John), New Brunswick, October 7, 1920. A. G. Huntsman." One small specimen with *Nephelopsis obscura*.

"Pond on fields at Moose Factory, Ontario, July 14-15, 1920. F. Johansen." One typical example.

"A.N.S. No. 1183, Rondeau Harbor, East Swamp; A.N.S. Nos. 1184, 5, Long Point, Ontario, August 18, 21, 28." These three specimens together with all others from Rondeau Harbor and Long Point, were taken during Professor Reighard's survey of the Great Lakes and are listed in my report on the leeches.

Glossiphonia heteroclita (Linnaeus)

"Bight of Ottawa River (Hull Park), Quebec, July 6-7, 1919. F. Johansen." One specimen 8 mm. long, colorless, translucent and delicate. The eyes show the characteristic pattern but only the right one of the first pair is present.

"A.N.S. No. 1186, Long Point, Ontario, August 18."

"A.N.S. No. 1187, Rondeau Harbor, Ontario, August 28."

Glossiphonia (Helobdella) fusca (Castle)

"Rideau Canal, Ottawa, Ontario, June 16, 1918. F. Johansen." One typical specimen bearing two small packets of ten and twelve eggs respectively. There are five series of prominent brown papillae, the double character of those of the median series being clearly indicated by their frequent irregularity of position or duplication.

"McKay Lake, Ottawa, Ontario, June 22, 1919. F. Johansen." Two specimens, one of the fine-lined smooth type, the other with prominent papillae and black or dark-brown segmental spots. The latter bears five egg capsules.

"A.N.S. Nos. 1151, 2, 3, Rondeau Harbor, Ontario, August 28."

"A.N.S. Nos. 1154, 8, 9, Long Point, Ontario, August 18; No. 1856, the same, August 21."

"A.N.S. No. 3435, French River, Georgian Bay, Lake Huron, on shell of *Physa* *griv.* A. D. Robertson, 1913."

Glossiphonia (Helobdella) stagnalis (Linnaeus)

"Alexandria Bay, Thousand Islands, New York, September 1, 1919. F. Johansen." Two small specimens with pale nuchal plate, with a specimen of *G. complanata*.

"Pool at Tadousac, Quebec, September 6, 1919. F. Johansen."

"Stream near Chelsea Road, Hull, Quebec, May 9, 1920. F. Johansen."

"Pool at Catfish Bay, Hull, Quebec, May 16, 1920. F. Johansen." One typical example bearing eggs.

"A.N.S. Nos. 1174, 5, Rondeau Harbor, East Swamp, Ontario, August 28."

"A.N.S. Nos. 1176, 7, Long Point, Ontario, August 21 and 23."

Placobdella phalera (Graf)

This species does not occur in the Ottawa Museum collection, but is represented by five specimens in the Academy of Natural Sciences collection, all of which were taken during Professor Reighard's survey of the Great Lakes.

"Elmsdale, Nova Scotia, August 15, 1919, July 6 and 20, 1920, and May 23-28, 1921. A. H. Leim." One taken August 15 bears four capsules of eggs of four to six each.

"A.N.S. Nos. 1204, 5, Rondeau Harbor, Ontario, August 28."

"A.N.S. Nos. 1206, 7, 8, Long Point, Ontario, August 16, 18 and 24 respectively."

Placobdella rugosa (Verrill)

"Elmsdale, Nova Scotia, August 15, 1919, June 29, 30, and July 13, 20, 1920. A. H. Leim." All small examples showing typical papillation. One taken August 15 bears young.

"Pools outside Huil, Quebec, October 5, 1919. F. Johansen." Leech with young ones new-born. One specimen 11 x 8 millimeters, longitudinally striped both above and below. Papillae moderate in size and number, but distinct. About a dozen young 2 mm. long in the bottle."

"Near Beaver Lake, Alberta, summer, 1907. A. Halkett." Two medium size, very rough specimens with *H. marmoratis* and *N. obscura*.

"A.N.S. No. 1201, Long Point, Ontario, August 23."

"A.N.S. Nos. 1202, 3, Rondeau Harbor, Ontario, August 28 and 24."

Placobdella parasitica (Say)

"A.N.S. No. 1191, Long Point, Ontario, August 19, 1899."

No examples of this species are found in the Ottawa Museum collection and only one Canadian specimen in that of the Philadelphia Academy. Professor Reighard, however, took it frequently during the explorations in Lake Erie, several times on the Canadian side, and Miss Ryerson found it common in Georgian Bay.

Protoclepsia occidentalis (Verrill)

"A.N.S. No. 3454, Black River, Prince Edward Island, August 24, 1912. Bayard Long."

This species has not previously been reported from Canada. It was not found by Miss Ryerson nor was it included in Professor Reighard's Lake Erie collections. It is, however, well known in the northern border states.

ICHTHYOBDELLIDAE

Piscicola punctata (Verrill)

"Elmsdale, Nova Scotia, June 5, May 23-28, 1921, dredged on mud bottom in from four to six feet. A. H. Leim."

These differ from the European *P. geometra* in the absence of eye spots from the caudal sucker and the very slight development of two annuli of complete somites so that only twelve instead of fourteen rings are obvious.

HIRUDINIDAE

Macrobdella decora (Say)

"Elmsdale, Nova Scotia, August 11, 1919; Enfield, Nova Scotia, July 12 and 15, 1920, 1 foot. A. H. Leim." Typical examples.

"Pembroke Lake, Grand Etang, Cape Breton Island, September 2, 1917. F. Johansen." A young individual 21 mm. long. The four groups of copulatory gland pores are plainly visible. With one *H. marmoratis* and nephelid egg cases.

"Burbidge, Quebec, July 23, 1918. C. L. Patch." Two specimens, one mature, the other not.

"Island Lake, Algonquin Park, Ontario, July 17, 1900. W. Spreadborough." Four mature specimens differing much in the amount of ventral blotching. One has only three groups of copulatory glands, the left posterior being absent. With one *Haemopsis marmoratis*.

"On Dore, Qu'Appelle Valley, Saskatchewan, summer, 1907. A. Halkett." Four mature specimens with well-developed copulatory glands and clitella and with penes protruded. Two are plain, two spotted ventrally.

Another example 66 mm. long is in an unlabelled bottle with one *Erpobdella punctata*.

"A.N.S. No. 253, Lac Aux Sables, Quebec, 1894. Dr. W. E. Hughes."

Haemopsis marmoratis (Say)

"In a freshwater pond, Amherst, Magdalen Islands, Quebec, middle of June, 1917. Philip Cox." One of a nearly uniform slate color.

"Elmsdale, Nova Scotia, May 22, June 1 and July 2, 1921. A. H. Leim."

"Neil Harbor, Cape Breton Island, July 29, 1917. Philip Cox." One 28 x 7 mm. Brown above with widely scattered small dark-brown spots; paler below with only three or four small spots. The left paired jaw bears eleven pairs of teeth.

"Pembroke Lake, Grand Etang, Cape Breton Island, September 2, 1917. F. Johansen." One sparsely spotted, medium-sized specimen with a young *M. decora* and nephelid egg cases.

"Mount Herbert, Prince Edward Island, September 3, 1919. J. Robert Mutch." A letter from the collector accompanying these specimens states that they were found in a swamp and are very common. Two measure 80 x 12 and 52 x 7 mm. respectively. The larger with well-marked clitellum covering fifteen small annuli and extruded filiform penis; the smaller without indications of sexual maturity. Both are very dark—nearly uniform slaty-black above with very distinct white sensillae, brownish-gray below heavily mottled with black.

"Pond at Cheticamp, Cape Breton Island, July 1, 1917. F. Johansen." One.

"Pond on fields at Moose Factory, Ontario, July 14-15, 1920. F. Johansen." Three specimens, one of large size, two thickly, one sparingly blotched.

"Missinaibi River, Ontario (between Mattice and Opazatika River), June 24, 1920. F. Johansen." Two small specimens.

"Abitibi River, Ontario (between New Post and Moose River), middle of October, 1920. F. Johansen." One small specimen.

"Government River Post, Albany River (at lat. 51° 30' N.), August 16, 1920. M. Y. Williams." One specimen.

"Brook near Ottawa, Ontario, June 30, 1918. F. Johansen." A young specimen 11 mm. long with the clitellum already developed. The female genital orifice is one annulus further forward than usual, being therefore removed from the male orifice by only four annuli.

"Pickwick Lake, north of Thurso, Quebec, June, 1903. A. Halkett." One thickly and finely mottled with black.

"Long Lake, north of Lake Superior, Ontario, August, 1916. F. W. Waugh." One heavily blotched.

"St. Joseph Island, Sault Ste. Marie, Ontario, September 3, 1918. F. Johansen." One of a dark slate color above, paling at the margins into the bluish-white of the venter. Dorsally are a few very conspicuous scattered irregular pale spots.

"Island Lake, Algonquin Park, Ontario, July 17, 1900. W. Spreadborough." One.

"Probably from lakes in Alberta and Saskatchewan, 1894. John Macoun." A fine specimen, notable for the almost complete loss of the usual secondary dividing furrows on the enlarged annuli vii a 3 and vii a 1. With one *H. grandis*.

"On Dore, Qu'Appelle Valley, Saskatchewan, summer, 1907. A. Halkett." One.

"Near Beaver Lake, Alberta, summer, 1907. A. Halkett." Three.

"In warm sulphur water, Vermillion Lakes, Banff, Alberta, coll. 17- VII-16. C. G. Hewitt." One.

"A. N. S. No. 3398, Kingston, Ontario, October, 1915. A. B. Klugh. Under stones."

"A. N. S. No. 3399, Lake Ontario, October, 1915. A. B. Klugh."

"A. N. S., No. 3457, Prince Edward Island, August 24, 1912. Bayard Long."

The wide range and general distribution of this species across the entire east and west width of Canada is evident from the above series. When the color is not mentioned it is the typical dark blotched pattern on a paler background. The green pigments of the living leech are lost upon preservation. The *H. sanguisuga* reported from Newfoundland by Blanchard is probably this species.

(To be continued)

PROSECUTIONS

Migratory Birds Convention Act and Northwest Game Act, by Officers of the Dominion Parks Branch and Royal Canadian Mounted Police.

MIGRATORY BIRDS CONVENTION ACT.

REPORTED DURING THE PERIOD—MAY 19, 1921—
OCTOBER 24, 1921.

Willard Jordan, Murray Harbour, Prince Edward Island. Attempting to kill a Brant in close season. Fine \$10.00 and costs.

Simon Jordan, Murray Harbour, Prince Edward Island. Attempting to kill a Brant in close season. Fine \$10.00 and costs.

Willard Crook, Cape Traverse, Prince Edward Island. Killing a Canada Goose in close season. Fine \$10.00 and costs.

Alex. Boudreau, Esquimaux Point, Quebec. Having in possession Eider Ducks in close season. Dismissed.

Alfred Boudreau, Esquimaux Point, Quebec. Having in possession Eider Ducks in close season. Dismissed.

Louis Bariau, Esquimaux Point, Quebec. Having in possession Eider Ducks in close season. Dismissed.

Brent Eisenhauer, Indian Point, Lunenburg County, Nova Scotia. Shooting at Ducks out of season. Dismissed.

Allison Johnson, Mahone Bay, Lunenburg County, Nova Scotia. Shooting at Ducks in close season. Fine \$10.00 and costs.

Hector Landry, Durlingville, Alberta. Shooting one Green-winged Teal in close season. Fine \$10.00 and costs.

Merritt Brown, Grand Harbour Rd., New Brunswick. Killing Black Duck in close season. Fine \$10.00 and costs.

John Harvey, Seal Cove, Grand Manan, New Brunswick. Taking Gulls' eggs. Fine \$10.00 and costs.

Hatsel Cronk, Little Wood Island, Grand Manan, New Brunswick. Taking Gulls' eggs. Fine \$10.00 and costs.

Bruce Stanley, North Head, Grand Manan, New Brunswick. Taking Gulls' eggs. Fine \$10.00 and costs.

Peter Stanley, North Head, Grand Manan, New Brunswick. Taking Gulls' eggs. Fine \$10.00 and costs.

John Johnson, North Head, Grand Manan, New Brunswick. Taking Gulls' eggs. Fine \$10.00 and costs.

Fulton Fleet, Seal Cove, Grand Manan, New Brunswick. Molesting migratory game birds in close season. Fine \$10.00 and costs.

Robert Green, Seal Cove, Grand Manan, New Brunswick. Molesting migratory game birds in close season. Fine \$10.00 and costs.

Coleman Green, Seal Cove, Grand Manan, New Brunswick. Attempting to kill migratory game birds with the use of a power-boat. Fine \$10.00 and costs.

Robert Green, Seal Cove, Grand Manan, New Brunswick. Attempting to kill migratory game birds with the use of a power-boat. Fine \$10.00 and costs.

Coleman Green, Seal Cove, Grand Manan, New Brunswick. Molesting game birds in close season. Fine \$10.00 and costs.

Coleman Green, Seal Cove, Grand Manan, New Brunswick. Wilfully furnishing false information to a game officer. Fine \$10.00 and costs.

W. R. Wadsworth, C.P.R. Building, Toronto, Ontario. Shooting a Semipalmated Sandpiper. Fine \$10.00 and costs.

Lionelle Raymond, St. Denis de Kamouraska, Quebec. Having in possession a Semipalmated

Sandpiper. Fine \$10.00 and costs. Suspended.

John McCarthy, Killarney, Manitoba. Shooting Blue-winged Teal in close season. Fine \$10.00 and costs.

W. Woods, Killarney, Manitoba. Shooting Blue-winged Teal in close season. Fine \$10.00 and costs.

Dame Onesime Despres, 148 St. Bernard St., Quebec, Que. Having in possession one live Bobolink. Withdrawn.

Wm. Francis Slade, Westmount, Quebec. Illegal possession of Semipalmated Sandpipers. Fine \$10.00 and costs.

Wm. Townsend, Grand Pre, King's County, Nova Scotia. Molesting Semipalmated Sandpipers by discharging a gun with intent to kill. Fine \$10.00 and costs.

J. V. Welsh, Turtle Tank, Mine Centre, Ontario. Having a migratory game bird, viz: plover, in his possession without lawful excuse contrary to sec. (6) of the M.B.C.A. Fine \$10.00 and costs. Seizure: one shot-gun.

R. Paquet, Magog, Quebec. Having in possession one Great Blue Heron. Fine \$10.00 and costs.

H. A. Channell, East Bolton, Quebec. Having in possession one Grebe. Fine \$10.00 and costs.

Fred Mitchell, Sherbrooke Quebec. Having in possession one Wood Duck. Fine \$10.00 and costs.

Henri Menard, Eastman, Quebec. Having in possession two Mergansers in close season. Fine \$10.00 and costs.

Henri Menard, Eastman, Quebec. Having in possession one Great Blue Heron. Withdrawn.

Harry E. Reid, Windsor, Nova Scotia. Having in possession one Great Blue Heron. Fine \$10.00 and costs.

E. J. Hibbert, Chipman's Corner, Nova Scotia. Hunting Woodcock in close season. Fine \$10.00 and costs.

H. Whittier, R.R. No. 2, Magog, Quebec. Having in possession one Great Blue Heron. Fine \$10.00 and costs.

H. J. Placey, 17 Wellington St., S., Sherbrooke, Quebec. Having in possession one Loon. Fine \$10.00 and costs.

John Murphy, New Minas, King's County, Nova Scotia. Having in possession Semipalmated Sandpipers in close season. Fine \$10.00 and costs.

NORTHWEST GAME ACT PROSECUTIONS.

R. W. Phillips, Victoria Island, Northwest Territories, Violation of Section (6) of the Regulations under the Northwest Game Act, which prohibits hunting and trapping, except by Eskimos, on Victoria Island, Northwest Territories—A fine of \$100.00, without costs was imposed, or, in default, two months imprisonment with hard labour at Fort McPherson. The accused being destitute the warrant of commitment was suspended on condition that the accused leave the Territory by the first steamer. Accused left the country. Seizure: Three White Fox skins.

George Komana, Kittigaruit, Northwest Territories, Trapping Fox out of season. Fine \$50.00. Seizure: Two White Fox skins.

ADDITIONAL NOTES ON THE WINTER BIRDS OF THE OKANAGAN VALLEY, BRITISH COLUMBIA

BY J. A. MUNRO, OKANAGAN LANDING, BRITISH COLUMBIA.

Since the publishing of a list of the winter birds of the Okanagan Valley in 1917*, a number of additional records have been made which may be of some interest. In the list referred to, annotations were given on one hundred and ten species and sub-species known to occur during the winter months, and, with the additions here recorded, the list is increased to one hundred and twenty-two. Winter is defined for the purposes of this paper as being between November 1st and March 1st inclusive.

LONG-TAILED DUCK: *Harelda hyemalis*. An adult male shot in Bissett Creek near Lumby on November 15th, 1918, was brought to the local

taxidermist. This species is known as a scarce and irregular migrant.

CANADA GOOSE: *Branta canadensis canadensis*. At Vaseaux Lake on December 22nd, 1920, I heard honkers flying over and was told by the residents that they winter regularly in this section.

VIRGINIA RAIL: *Rallus virginianus*. An adult female in my collection was taken at Summerland on December 22nd, 1919.

PRAIRIE FALCON: *Falco mexicanus*. A young male was taken at Okanagan Landing on November 6th, 1921.

GRAY GYRFALCON: *Falco rusticolus rusticolus*. A specimen of this rare falcon was taken at Kelowna on December 1st, 1916, and is now in the collection of Mr. L. E. Taylor.

*The Ottawa Naturalist, XXXI, pp. 81-89.

SPARROW HAWK: *Falco sparverius*. A second winter record for this species was made on February 17th, 1919.

LEWIS' WOODPECKER: *Asyndesmus lewisi*. During the winter of 1920-21 two of these birds were seen near Kelowna by several persons who described them to me. I had seen one in that locality on October 23rd, 1920—a notably late record as they usually leave during the last week of August.

HOYT'S HORNED LARK: *Otocoris alpestris hoyti*. On December 5th, 1918, I took an example of this race from amongst a large flock of *arctica*. This specimen is now in the Brooks collection.

RUSTY BLACKBIRD: *Euphagus carolinus*. On December 5th, 1918, three Rusty Blackbirds accompanied by two Killdeer were seen on the lake shore at Okanagan Landing, and two specimens were taken, establishing a new record for the Okanagan Valley. Two other specimens were taken on November 13th, 1919. Prior to this the Rusty Blackbird had been recorded from the following localities in British Columbia, namely Edgewood, Metlakatla and Atlin. In a discussion of the status of this species in British Columbia with Mr. H. S. Swarth, he informed me that he found them breeding commonly near Hazelton during the past summer (1921).

BREWER'S BLACKBIRD: *Euphagus cyanocephalus*. In my former list, I stated that large numbers of Brewer's Blackbirds wintered in the City of Kelowna during 1912-13, but that none had been seen north of this. During the winter of 1917-18 a flock of twenty remained in the creek bottom between Okanagan Landing and Vernon. They were frequently seen following the rooting operations of a drove of pigs which were ranging over some newly ploughed land.

CASSIN'S PURPLE FINCH: *Carpodacus cassini*. Prior to 1917, winter records for this species were uncommon, but since then their appearance has been more regular. During the winter of 1920-21

they were quite common, a flock of forty being seen on January 24th.

WHITE-WINGED CROSSBILL: *Loxia leucoptera*. Specimens were taken on November 29th, 1919, at Okanagan Landing. These were associated with bands of American Crossbills which are much more numerous and of more frequent occurrence than *leucoptera*.

REDPOLL: *Acanthis linaria linaria*. Formerly an abundant winter resident arriving early in November and remaining until the latter part of March. None were seen after the winter of 1916-17 until the present year (1921), when a single bird was noted amongst a flock of Juncos on December 19th. On the following day a flock of twelve were seen and these are still in the vicinity at the time of writing (December 22nd, 1921).

CEDAR WAXWING: *Bombycilla cedrorum*. Two Cedar Waxwings were seen on numerous occasions from December 28th, 1920, until the following spring. This record is notable in that this species leaves early in September and is one of the last migrants to arrive in the Spring.

ROCKY MOUNTAIN CREEPER: *Certhia familiaris montana*.

SIERRA CREEPER: *Certhia familiaris zelotes*.

Apparently these two races occur in equal proportion during the winter. *Zelotes* as compared with *montana* is considerably smaller, decidedly more brownish on the upper parts and with a relatively shorter bill.

I am indebted to Dr. Louis B. Bishop for the identification of specimens.

CHESTNUT-BACKED CHICKADEE: *Penthestes rufescens rufescens*. A small band was found near Rollings Lake, twenty miles northeast of Vernon in December, 1918.

WESTERN BLUEBIRD: *Siala mexicana occidentalis*. This species is becoming a regular winter resident; a small flock has been seen each year since first recorded in 1916.

ORNITHOLOGICAL OCCURRENCES AT TORONTO, ONTARIO, JANUARY, 1922

BY STUART L. THOMPSON.

Toronto and the surrounding country has seen several unusual records of bird life this winter. The weather, although cold at times, was often very mild, the temperature going above freezing and there being an unusual lack of snow. The city streets have been quite bare and many hillsides throughout the country still show the frozen earth and dead leaves of the fall. This lack of snow on certain hillsides is not due to its having

melted so much as to the fact that there have been several days of strong winds which tended to drift the snow onto some places more than others. No days warm enough to cause buds to burst have occurred and rainy days have been very few. The Don and Humber Rivers have both been solidly frozen over except in swifter parts and Toronto Bay has been more or less open in patches.

There were reports from northern woods to the effect that the usual crop of bird foods—seeds, berries, etc.—was poor, which led many of us to be on the watch for some of the irregular and rare winter visitants, such as Pine and Evening Grosbeaks, Redpolls, Canada Jays and Snow Buntings. As early as November some of these appeared. Snow Buntings and Canada Jays were both seen at Scugog Lake on November 7, while I was hunting ducks, and a week later Pine Grosbeaks were seen at the Humber River. During December I saw several flocks of Redpolls in the Don valley, but at no time were any Canada Jays seen in the vicinity of Toronto. Other rather unusual visitants this winter were a pair of Cardinals, which were seen feeding on berries on December 18 in the Humber valley. The same day a Belted Kingfisher was seen—rather a late date. With these unusual late records an interesting winter seemed in view. Taking advantage of every opportunity, I went out early every Sunday morning and some of the results were most gratifying, considering that often the weather at the time was very uninviting. Although little snow was flying and there were probably not more than 5° or 10° of frost, the strong western winds which blew made ornithological work endurable only in sheltered ravines or deep woods.

Week by week, my records are as follows:

January 1.: Downy Woodpecker, Tree Sparrow, Song Sparrow, Chickadee.

January 8.: Great Black-backed Gull, Ring-billed Gull, American Scoter, Hairy Woodpecker, Junco, White-breasted Nuthatch.

January 15.: American Merganser, Scaup Duck, American Golden-eye, Red-headed Woodpecker, Northern Shrike.

January 22.: Red-breasted Merganser (?), Sparrow Hawk, Brown Creeper.

January 29.: Saw-whet Owl, Evening Grosbeak, Swamp Sparrow, Robin.

In all, 22 species were seen in January. Besides seeing these, I have heard Pine Grosbeaks, a Screech Owl, Blue Jays and Redpolls, without being able to locate them at the time. Many of these birds seen are, of course, regular winter visitants or permanent residents, whose presence is expected almost any day in winter. Strange to say, I have not, throughout the whole month, either seen or heard a Crow. On other winters I have noted great flocks of Crows, even on January 1.

The more interesting notes on the species observed are as follows.

SONG SPARROW. Rarely stays all winter. I found a dead specimen in the winter of 1905 and saw one alive on February 6, 1921. This year,

however, I have found the Song Sparrow once at the High Park marsh and once in the Don valley; apparently quite cheerful.

SPARROW HAWK. This bird was seen perched on a dead branch of a pine tree on the lee side of a residence near High Park. There was a high wind blowing at the time and he seemed very loth to take flight, so that we came quite close to him. Finally he flew off through the park, when his typical flight could not be mistaken.

RED-BREASTED MERGANSER. I must admit being doubtful of this identification. As I was strolling through the Don valley, I came upon a pair of these birds who took flight at once. They had been feeding in a small open part of the river, where the rapid current kept a few yards unfrozen. I had no difficulty in recognizing them as Mergansers, not only by their plumage, for, on account of my coming up under cover of a steep bank, I came within about 30 yards of them, but also by the manner in which they made a wide circle and flew down the valley again directly over my head, when their thin, narrow bills were quite readily seen.

SWAMP SPARROW. This bird was found in company with a flock of Tree Sparrows who are to be seen in a frozen marsh in High Park throughout the winter. I was first attracted to him by his note—so different from any which the Tree Sparrows were uttering at the time. On my approach the Tree Sparrows moved to the other side of the marsh, but this particular stranger sought cover and remained skulking from clump to clump until finally, after many fleeting glances through the reeds, he showed himself plainly on a twig, when he was readily identified. The Song Sparrow mentioned previously was seen near here also.

ROBIN. Plainly seen on a sunny hillside near the Humber, foraging about on the bare ground. He uttered his call and was apparently in good condition and plumage.

RED-HEADED WOODPECKER. Three of these birds have been seen at one time in High Park. Several times people have mentioned seeing one where I saw my three. On another occasion, I saw one about a mile away. It seems hardly likely that this is one of the three, for at no time did any fly very far. Seemingly they all preferred to remain quiet and, on windy days, cling to the lee side of tree trunks as I watched them.

EVENING GROSBEAK. A flock of eight were seen eating Manitoba maple seeds in the Humber valley. None were seen elsewhere, although they were reported in various parts of the city.

As for Ducks, American Mergansers, and Gulls, they all were seen in Humber Bay. Although the

river is frozen over, its mouth and the bay are still open. The city has built a long concrete breakwater along the water-front, about 50 or 100 yards from shore. This forms a lagoon which in milder weather is open and which is protected from the open lake's waves and so is an ideal resting spot for water birds.

Many times I have seen Great Black-backed and Ring-billed Gulls resting on the concrete wall where they were easily seen through field-glasses. On several occasions I have seen what I believe to be the same flock of American Mergansers feeding and sporting in the quiet lagoon. Generally there are two males and three females. On January 29 a fourth female appeared. All per-

mitted a very close approach, but the one female did not follow the rest in flight. Later we saw her distinctly at a distance of a few yards, for she dived and came up close to us by the pier at the mouth of the river. There are generally several Golden-eyes here also, very tame, for people are often seen crossing Humber Bridge at this point. Once a small flock of Scaup Ducks were here and on another occasion I identified an American Scoter. I have never yet been sure of the identity of large flocks of ducks which I see farther out on the lake, but the Long-tail (Old-Squaw) is an abundant visitant here in some winters. It is probable that these flocks are Long-tailed Ducks.

NOTES AND OBSERVATIONS

THE STARLING, *Sturnus vulgaris*, AT TORONTO, ONTARIO

The following note from my diary has been held, till confirmatory records of the Starling as an Ontario bird appeared. The date was August 24, 1920.

"While in my garden (Rusholme Road) about 7.30 this morning, watching for migrants, I saw a flock of seven birds fly west over the garden, and pass out of view, just clearing some tall elms across the road. I was at the east end of the garden when the birds were first seen directly above me, and I was able to watch them for nearly three hundred feet of their flight, and instantly decided they were English Starlings; the shape of the birds, their flight, and the movements of the flock were characteristic; and I had no doubt, while the birds were in sight, of their identity."

J. H. FLEMING.

YOUNG WEASELS

At Bella Coola, British Columbia, on June 18, 1921, my attention was called by Master Wilfred Christensen and his playmate, Master Donald Morrison, to two shivering young weasels which they had found under some boards filling a shallow waterway across a wood road. They said a parent weasel had carried off a third kitten weasel, and they were keeping both parents away by flourishing sticks. Both parents were continually rushing out and retreating. After examining the kittens, which had bodies about five inches long, we all stepped back perhaps fifteen feet and waited quietly. Soon we heard the chirping cry of one parent weasel as it ran out, looked at us, dodged around a stump, and looked at us again. It then rushed to the young weasels, seized one, apparently by the ear, but possibly by the neck or head, and

whisked it away out of sight under the boards and brush. In a few moments it returned and removed the other slightly larger kitten weasel in the same manner. The old weasel seemed smaller in girth than the kitten, but this may have been an illusion caused by the slenderness of the adult.

HARLAN I. SMITH.

DISEASED SHARP-TAILED GROUSE IN MANITOBA.

During the hunting season for grouse in Manitoba—October 15 to 22, 1921—thirty examples of the Prairie Sharp-tailed Grouse (*P. phasianellus campestris* Ridg.) were shot near the writer's home at Aweme. On being prepared for cooking two of these birds were found to be very thin and a post-mortem examination revealed the fact that the liver was severely affected by tuberculosis of a nature apparently identical with that found in domestic poultry. Whether the disease is really as prevalent as these examples indicate cannot, at present, be told, but in any case the presence of such a disease in one of our most valued game birds is a matter of considerable importance as it may well prove one of the chief factors in retarding the bird's increase. The disease may be spread in several ways, but it would probably make its greatest progress during the "dancing" period in spring time, when the males gather on certain small areas, or in Autumn, when the birds often collect into large flocks.

NORMAN CRIDDLE.

THE ANNUAL MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION

The thirty-ninth Stated Meeting of the American Ornithologists' Union was held in Philadelphia,

November 7th to 12th, 1921, An unusually large attendance was present.

The business meeting was held the afternoon and evening of November 7th, when a "Shore Dinner" was given by the President of the Union to the Fellows. Amongst the Members raised to the Fellow class was our countryman, Major Allan Brooks, of British Columbia. A large number of Canadians were elected Associates.

Public meetings given to the reading and discussion of papers occupied the 8th to 10th. The Annual Dinner was celebrated the evening of the 9th and on the 11th and 12th opportunity was given to visit the Zoological Gardens and points of historical and ornithological interest near the city.

One paper on Canadian ornithology was read: "Some Breeding Birds of Saskatchewan," by Mr. Geo. H. Stuart, who visited the vicinity of Crane Lake last summer.

Much of the pleasureable success of the meeting was due to the hospitable welcome extended by the various members of the Delaware Valley Ornithological Club and by the Academy of Natural Sciences, which threw its doors wide open to the Union and in whose halls the meetings were held.

Among those present were: Messrs. Edward Arnold, Montreal; J. H. Fleming, Toronto; Hoyes Lloyd, Ottawa; W. E. Saunders, London; P. A. Taverner, Ottawa.

One visitor from England was present, H. Kirk Swann, who is visiting American ornithologists for the purpose of obtaining material for his Synopsis of the Accipitres, now in course of publication.

The next Annual Meeting will be held in Chicago.

LECTURES TO SCHOOL CHILDREN

During the winter of 1920 to 1921, the Victoria Memorial Museum re-established the old policy of providing a course of lectures for the entertainment and instruction of the school children who throng the building every Saturday morning. Many members of the museum staff offered their services for these lectures, and the Department of Trade and Commerce co-operated by providing moving pictures and an operator. In consequence, every lecture was illustrated with lantern views, and all but one with moving pictures as well; at this one living animals were presented. So popular did the lectures prove that they had to be repeated each morning to a fresh audience, as the hall, which has a seating capacity of 562, was not large enough to accommodate the crowds. In fact one lecture had to be given three times in the

same morning.

The following is the programme of the lectures; a similar programme has been arranged for the winter of 1921-22.

Feb. 12.—"The Fur Bearing Animals of Canada." By C. L. Patch.

Feb. 19.—"The Birds of Bonaventure Island." By C. L. Patch.

Feb. 26.—"The Canadian Arctic Coast." By K. G. Chipman.

March 5.—"Wanderings with the Eskimos." By D. Jenness.

March 12.—"Roads to Wealth in Our Northern Forest, or Mineral Development in Northern Ontario." By T. L. Tanton.

March 19.—"Hunting Giant Dinosaurs in the Badlands of Alberta." By Charles M. Sternberg.

March 26.—"Ottawa Three Times Submerged and How We Know It." By M. E. Wilson.

April 2.—"Conquering the Desert with Irrigation." By Harlan I. Smith.

April 9.—"Asbestos or Fire Proof Cotton." By R. Harvie.

April 16.—"My Summer Among the Ojibwa Indians." By F. W. Waugh.

April 23.—"The Frogs, Salamanders and Snakes of Ottawa." By Clyde L. Patch.

STRANGE ACTIONS OF A DUCK.

While on the North Shore of the Gulf of St. Lawrence in the summer of 1921, I witnessed what was to me very surprising behavior on the part of a wild duck.

The first occasion was at Natashquan, in the month of June, where I was then tenting with Harrison F. Lewis, Chief Federal Migratory Bird Officer for Ontario and Quebec.

The bird first attracted our attention by flying in circles over the harbor and shore quite near our tents, uttering a succession of low maternal quacks as it did so. While watching it, we saw it make several attempts or feints at alighting on the Government Wharf quite near us. We thought it was an American Golden-eye, though the total absence of the whistling sound made by the wings of this species when in flight as well as the subdued character of its distinctive markings made it somewhat of a puzzle, to me at least. After it had flown away we searched the rocks and barren in the vicinity for tree or stump where its nest might be, but without success.

On a day following, I was startled by the same bird flying down past me from off a warehouse built on the wharf, but as it was in flight before I saw it I could not locate its exact perch.

A couple of days later we embarked in the mail-boat to continue our journey along the coast but

were held at the wharf for a time by unfavorable wind and weather. While here, Mr. Lewis went one morning for a trip on shore, leaving me with the mail-carrier, Mr. Fred Jones, and his son, "Len."

As I had a very lively interest in the bird I had been watching, I asked my companions if they had noticed it. They stated that they had seen such a bird for several seasons in succession, and that it often alighted on the chimneys and roofs of the houses on shore. A few minutes after this conversation I was hailed from the deck by the boy, who announced, "Here is your duck now." Taking my field glasses I went on deck, to find the bird sitting on the ledge of a small window well up in the gable end of the warehouse at the farther end of the wharf. As the day was somewhat misty, I landed on the wharf and approached to about one hundred feet from where it sat. At this distance by the aid of the glasses my observation was about all that could be desired. From where I stood I could see the reflection of the bird in the glass of the window almost as plainly as I could see the bird itself, and it seemed to be this reflection that occupied the whole attention of Madam Duck herself. After a few moments she arose from her sitting position to her full height and seemed to be peering into the window and bobbing her head in an endeavor to establish friendly relations with her own shadow. The approach of some men along the wharf caused her to fly away and again I noticed the noiseless flight, though I had quite made up my mind that it was a female Golden-eye.

In the following month I was one day talking with two of the patients on the verandah of the Grenfell Mission Hospital at Harrington, and as usual the conversation was chiefly of the birds of the coast. I described the bird seen at Natashquan and asked them if they had ever seen one like it. They replied that they had, from their seat on the verandah, watched one nearly every day for weeks past and that they had seen it that morning. One of its usual performances, as described by them, was to visit the Episcopal Church adjacent to the Hospital to circle around the chimney, sometimes perching on it and sometimes for a short space disappearing into the opening. From their accurate description of the bird and its actions, I felt that they were stating facts. I asked them what they called this particular duck, and they replied that it was a "Smoky Pie" and they were greatly surprised that I did not know a duck of that name.

J. L. DE VANY.

CORRESPONDENCE

To the Editor of the Canadian Field-Naturalist:

Dear Sir:

I was much interested in the Note by Mr. Hoyes Lloyd in the May, 1921, number of *The Canadian Field-Naturalist* on "An Aquatic Habit of the Pigeons" and am able to add other instances of the habit. To quote my "Notes on the Rock Dove" (Auk, XXXII, 1918, p. 315) "Saunders (Manual of British Birds, 1889) says 'both wild and tame Pigeons have been seen to settle on the water like Gulls and drink while floating down stream.' Mr. Wm. A. Jeffries tells me he once saw a Pigeon alight on the surface of the Frog Pond in Boston Common. I have seen a Pigeon hovering above Charles River in Cambridge dropping its feet till they touched the water, picking up something with its bill. This was repeated five or six times."

In my "Bird Genealogy" (Auk, XXIX, 1912, pp. 288, 289) in a study of the relationship of the pigeons to the auks, gulls, and plovers in the group of Charadriiformes, I state that "I recently placed a half-grown Domestic Pigeon in a wash-tub of tepid water. With head and neck erect, the bird swam rapidly with alternate strokes of the feet to the side of the tub. The wings were arched up and waved slightly—not stretched out and flapped in the water as in the case of young Passerine birds. Its position was like that of a Duck, but low in the water. Progress was much more rapid than on land where the bird stumbled awkwardly along. Indeed it had never before left the nest. I repeated the experiment several times with the same result. A fact of considerable interest in this connection is that 'A Pigeon with a perfectly webbed foot [was] evolved at Cambridge by only three years' selected crossings' (T. Digby Pigott, 'London Birds and Other Sketches,' London, 1902, p. 239). This may be looked upon as a case of reversion."

In answer to Mr. Lloyd's question, therefore, I should say: This curious habit of alighting on the water has not been acquired independently, but has an ancient foundation.

CHARLES W. TOWNSEND.

Nov. 30, 1921.

98 Pinckney St., Boston

THE WILLET IN WESTERN NOVA SCOTIA

Editor, Canadian Field-Naturalist:

Sir:

It is with very great pleasure and interest I note the increase of that splendid shore bird, the Willet. My first remembrance of him was some forty years ago, when, a mere kid, I was tenting on the beach of St. Mary's Bay, in Digby County, Nova Scotia. My companion was a sportsman of note at that time. Our object was the shooting of

Black-breasted and Golden Plover. It was my first Plover-shooting trip and I recall that Golden and Black-breasted Plover were plentiful. A flock of sandpipers flew past my blind and among them I noticed a big bird with white stripes in his wings. The big bird fell at the report of my muzzle-loader. My shooting companion called it a "White Wing." We saw during our trip of four days some five or six of these big Willets. In those days of blessed memory they were scarce along St. Mary's Bay, and never in my recollection were Willets so plentiful as at the present time. Seven years ago I noticed with interest that Willets were nesting in Digby County. Since that time there are more of these birds nesting here each year, and more especially since the elimination of spring shooting can the increase be noticed. At the present time (June 18th, 1921) many birds are nesting at Little River Harbour, Yarmouth County, Villagedale, Shelburne County, and Grossecocques, Digby County. There are doubtless other places in western Nova Scotia where these birds nest. Willets are about the first of the large "Shore Birds" to leave us in the fall, and by September first not many remain here. Under the *Migratory Birds Act* these birds are protected. It is, however, a difficult matter to protect them fully, as only a comparative few of the present day shore bird shooters really know them at a glance. Of course the white of their wings is very distinctive, but during the month of August the coast-line where these birds are is very often obscured with fog and when a bunch of these large birds burst through the fog-mull it is difficult for the amateur to distinguish them in a second or so and decide they are on the "protected list." Willets are the easiest of the Shore Birds to decoy and "whistle" within shot (with the possible exception of the Yellow Legs).

They are, however, increasing very fast, much to the joy of all true sportsmen. Only yesterday I was among the nesting Willets. There was a real colony of them. They are very noisy birds at this season, and so bold they will nearly fly against one as you walk near their nesting grounds. Their constant cries of *Ca-luck, Ca-luck, Tee-da, Tee-da* still ring in my ears. There will be hundreds of young birds ready for the fall migration next August. Let us hope that not many of them will be mistaken for legal game during their flight and that all shooters will "have a care." I have never known so many Willets to nest in Digby County as there are this spring. If the increase continues at the present rate there will be little danger of this grand bird becoming extinct as was feared a short while ago.

H. A. P. SMITH, DIGBY, N.S.

Editor, The Canadian Field-Naturalist:

Dear Sir:

Having noticed in the issue of September last under "Notes and Observations" a reply by Harrison F. Lewis to a short article of mine on "The Birds of the Wilderness of Nova Scotia," I would say that Mr. Lewis' criticism of my notes as they appeared under the heading in *The Naturalist* is not far astray. My notes referred, however, to song birds alone, and should have been printed as the copy read, viz., "The Absence of Song Birds in the Wilderness of Nova Scotia." I may further say that if Mr. Lewis will *go back* into the interior of this province he will not fail to notice the scarcity of song birds; I do not mean the short trips usually taken by the trout fisherman, but back to the top of the watershed. I may further say that he will not there find the White-Throated Sparrow as he suggests. This bird is to me the finest song bird we have, and I am always on the alert to catch his pure notes. Neither will Mr. Lewis discover the Maryland Yellow-throat, nor the Chestnut-Sided Warbler. As far as Loons, Ruffed Grouse, and Blue Herons are concerned, they are certainly to be found there, but it would be most difficult to strain one's imagination enough to call them song birds. Mr. Lewis' mention of Herring Gulls proves to me that he has not been to the real wilderness of Nova Scotia, as these birds are seldom found so far from salt water in this province. Mr. James W. Stuber, Assistant Chief, Bureau of Fish and Game of Ohio, noticed this absence of song birds during his trip to the interior of the province. Writing in the *Sportsman's Review*, he says, "The silence was profound. Not a bird twittered." I have also read, in the same September number of *The Naturalist*, Mr. Lewis' article, "Among the Coffin Carriers," referring to the colony of Black-Backed Gulls at Lake George, Yarmouth County. As Mr. Lewis is now in Labrador, it will be of interest to know whether upon his return he will retain the same respect and love for this big gull that he carried with him into Labrador. Perhaps he may let us hear about it through *The Naturalist* when he gets back.

H. A. P. SMITH, DIGBY, N.S.

BOOK NOTICES

"LIFE HISTORIES OF NORTH AMERICAN DIVING BIRDS" (1919) and "LIFE HISTORIES OF NORTH AMERICAN GULLS AND TERNS" (1921), by Arthur Cleveland Bent. These two volumes, which are Bulletin 107 and Bulletin 113, respectively, of the United States National Museum, are a continuation of the series of "Life Histories" begun by the late Major Charles E. Bendire.

The systematic and thorough manner in which the life histories of the species dealt with are set forth is indicated by the following quotation from the Introduction to the "Life Histories of North American Diving Birds":

"After a few introductory remarks where these seem desirable, the life history of each species is written in substantially the following sequence: Spring migration, courtship, nesting habits, eggs, young, sequence of plumages to maturity, seasonal molts, feeding habits, flight, swimming and diving habits, vocal powers, behavior, enemies, fall migration, and winter habits. An attempt has been made to avoid repetition in dealing with subspecies."

The task which the author has thus outlined for himself has, in general, been well performed. Previous publications have frequently been drawn upon for essential data and apt passages so that the volumes summarize the knowledge already available in this field. Much original matter has also been contributed, both by the author himself, who has travelled far and wide to study North American birds in their homes, and by a host of other ornithologists, who have furnished notes and data on particular points. Although the volumes thus present admirable and strictly up-to-date accounts of the life histories of the species considered, this serves to emphasize the fact that our knowledge of the life histories of many species is very unsatisfactory. Little or nothing is known about the place and manner of the nesting of several species, such as the Marbled Murrelet and the gray-winged gulls (Kumlien's and Nelson's). There is a very great deal for students of avian life histories yet to accomplish.

An important addition to the text in the second volume is information regarding reservations and the species which are protected in them. This information hardly does justice to Canadian reservations established under the *Migratory Birds Convention Act*, but this may be due to the fact that the manuscript for this volume was completed a considerable time before the volume was published.

Several of the life histories in each volume are contributed by Dr. Charles W. Townsend.

The illustrations form a most pleasing and valuable feature of these publications. Abundant half-tone plates, depicting chiefly birds and birds' nests in their natural surroundings, are scattered through the text. Special colored plates, showing in their actual sizes one or more typical eggs of every species dealt with whose eggs are available, are bound in each volume. These are of a very high quality, especially those in the volume on the Gulls and Terns, which are on egg-shell paper and

are beautiful examples of their kind.

The author defends the Loon against persecution, thus furnishing justification for the legal protection now accorded to Loons in Canada and the United States under the *Migratory Birds Convention*. Speaking of the fact that the Loon's diet of fish includes trout, he says, "Some sportsmen have advocated placing a bounty on loons on this account, but as both loon and trout have always flourished together until the advent of the sportsmen, it is hardly fair to blame this bird, which is such an attractive feature of the wilds, for the scarcity of trout. We are too apt to condemn a bird for what little damage it does in this way, without giving it credit for the right to live." With these statements, which are capable of a wide general application, the reviewer is in hearty agreement.

Mr. Bent speaks of the much-discussed soaring flight of Gulls, saying "To my mind it is simple enough to understand, if we can realize that a gull is a highly specialized, almost perfect sailing vessel, endowed with instinctive skill in navigating the air to use the forces at its command to advantage. With a clear knowledge of the forces at work when a ship sails, close hauled, to within a few points of the wind, we can imagine the gull sailing along a vertical plane, in which the force of gravity replaces the resistance of the water against the keel and the wind acts against the gull's wings as it does on the sails of the ship; the resultant of these two forces is a forward movement, which the gull controls by adjusting its center of gravity and the angle of its wings."

Although this analogy is plausible at first glance, it will not stand investigation. There is a radical difference between the action of the force of gravity upon a soaring bird and the action of the resistance of the water against the hull and keel of a vessel sailing close-hauled. The resistance of the water against a vessel always acts directly to consume the component force making for leeway, whereas the force of gravity acts upon the bird's mass in a fixed direction, at right angles to the force exerted by a horizontal current of air. It therefore cannot prevent leeway, and, however, the force of a horizontal wind may be divided into components by the position of the soaring bird's wings and body, the ultimate resultant of those components must be such as to cause the bird to move to leeward, not to windward. This fact can be demonstrated readily by means of the usual formal diagrams indicating resolution of forces, the reproduction of which here would exceed the limits of this review.

The true explanation of the undeniable fact that Gulls and other birds do soar against the wind

without loss of elevation must be sought elsewhere. No satisfactory solution of the problem has yet been made public. It will be sufficient to point out here that one of the best authorities on the subject, Dr. E. H. Hankin, in his recent work on "Animal Flight" (Iliffe & Sons Ltd. London, 1913[?]), states (p. 59) that "In other words, in attempting to discover the source of the energy of soaring, the movement of tangible masses of air that we know as wind must be left out of account." and presents an abundance of carefully recorded observations in support of his statement. Neither superficial observations nor hasty conclusions will solve this important question of soaring flight.

Several minor errors which these two volumes contain may well be corrected here, lest they persist as truth.

The most southerly breeding station of the Puffin is given (p. 89) as Matinicus Rock, Maine, although Macoun's breeding record (1909) for this species at Seal Island, Yarmouth County, Nova Scotia, is referred to on the same page. Seal Island is farther south than Matinicus Rock, and although it is possible that Puffins now no longer breed there, no evidence to this effect is given in this life history. The reviewer saw a pair of Puffins at Seal Island in July, 1912, but Dr. C. W. Townsend could find none there in the summer of 1920.

In the life history of the Horned Puffin, mention is made (p. 98) of a breeding colony of the species on Atka Island, Aleutian Islands, and it is stated (p. 103) that the breeding range of the species extends "throughout the Aleutian Islands." On page 100 it is stated that "The southernmost colony of Horned Puffins, so far as I know, is on Forrester Island in southern Alaska." Forrester Island is much farther north than Atka Island, and, in fact, is farther north than a large part of the Aleutian chain.

The most southern point in the breeding range of the Herring Gull is stated (p. 102) to be No-Man's-Land in Penobscot Bay, Maine, although a foot-note adds that a few Herring Gulls have recently bred near Marthas Vineyard. But in any event, No-Man's-Land is not the most southern breeding place of this Gull, for there is a large well-known breeding place on Seal Island, Yarmouth County, Nova Scotia, which is farther south than No-Man's-Land.

Recent publications by Dr. C. W. Townsend do not describe the Common Murre and the Razor-billed Auk as being so nearly extirpated on the southern coast of Labrador as Mr. Bent's remarks on this subject would lead one to conclude.

On page 8 ("Gulls and Terns") it is stated that Mr. Frank C. Hennessey "accompanied the A. P. Low expedition to the regions north of Hudson Bay". This is incorrect. Mr. Hennessey's valuable

experience in the Arctic was gained while he was with the expedition on the Dominion Government Steamer *Arctic*, under command of Capt. J. E. Bernier, in 1908 and 1909. He did not accompany the A. P. Low expedition.

In the description, on page 330 of the second volume, of Plate 16, showing Great Black-backed Gulls, it is stated that the lower photograph represents "adult and young bird, one year old". This is evidently an error for "adult and bird of the year", for Great Black-backed Gulls, one year old, are not given to frequenting the nesting-grounds of the species, and the individual in question appears to be in the juvenal plumage.

Although the life history of the Great Black-backed Gull makes frequent mention of the breeding colony at Lake George, Yarmouth County, Nova Scotia, the breeding range of this species is said (p. 85) to extend "southward . . . to . . . Nova Scotia (Pictou, Halifax, and Kentville) and Bay of Fundy, (Isle au Haute)". Lake George is considerably farther south than any of the four other points named.

In the description of the former breeding range of the Laughing Gull no mention is made of the fact that it extended to Canada. Dr. H. Bryant collected two pairs on Green Island, near Yarmouth, Nova Scotia, in 1856. The condition of the females showed that they had just finished laying. (*Proc. Bost. Soc. Nat. Hist.*, VI, p. 122.)

The statement is made concerning Thayer's Gull (p. 121) that only some 25 specimens of the species are available for study. The Victoria Memorial Museum, Ottawa, is fortunate in possessing a fine series of some 30 specimens of Thayer's Gull.

Finally, a few remarks may be made concerning the editing of these works. Publications of this kind need make no pretense to artistic merit, which may characterize the writings of none but the gifted few, but sound English is justly to be expected of them. The facts of science should be correctly expressed. It is true that exact quotations from other publications must at times introduce incorrect expressions, and that misprints cannot be wholly avoided. These things are excusable. But the original matter of the volumes under review contains a large number of conspicuous solecisms which cannot be defended. The over-heavy burden of work which the production of these life histories doubtless lays upon their author may confine his attention to the ornithological facts involved, but it is regrettable that there should not be more careful editing of the text of these important official publications.

Everything considered, these "Life Histories" are most interesting, valuable, and important volumes, which should be found in every library and should be in the hands of every ornithological worker. It is to be hoped that future volumes of the series will appear with as little delay as possible. They will be awaited eagerly.—H. F. L.

The Canadian Field-Naturalist

VOL. XXXVI.

OTTAWA, ONT., FEBRUARY, 1922.

No. 2

SOME NOTES OF THE GROWTH OF ARBUTUS MENZIESII—PURSH

By C. C. PEMBERTON



FIG. 1.—PIONEER TYPE. *Arbutus Menziesii*, Pursh

This arbutus is a good example of the open grown tree of the natural park-lands of the southern end of Vancouver Island. The limbs stretching forth all around the stem denote that the tree in early life had plenty of room. The second growth Douglas Fir is evidently of recent origin. Locality, Rocky Point, Metchosin, Vancouver Island, B.C.

PIONEER TYPES.

The arbutus is a tree the habits and characteristics of which are of absorbing interest to the nature student. Its occurrence and distribution in these latitudes is fittingly described by John Muir ("Steep Trails," Houghton Mifflin Co., Boston and New York, 1918, p. 235) as "standing there like some lost or runaway native of the tropics, naked and painted, beside the dark mossy ocean of northland conifers."

On the southern end of Vancouver Island, in the vicinity of Victoria and on many of the adjacent islands of the Straits of Juan de Fuca and the Gulf of Georgia, the pioneer type of arbutus grew as large single trees, scattered on the plains, on the margins of the forest and on the sparsely wooded crests of hills and rocky elevations. The forms of these arbutus denote that they have grown in the open and were not at any time in early life crowded by other trees. A good example of the type is

shown in Fig. No. 1. The huge limbs stretching out in all directions prove that the tree must have had plenty of room in the past. The young growth of Douglas fir surrounding the arbutus is of recent origin.

HELIOTROPIC RESPONSE.

When the arbutus is compelled to strive for light in competition with other trees it shows the characteristics of positive heliotropism to a degree surpassing most of its competitors. It has learned to dodge and looks as if it were trying to avoid contact with its neighbors. If the surrounding trees are destroyed, then the arbutus, curved and bent over, forms a unique feature of the landscape. In Fig. No. 2 the curved arbutus is a good example of the heliotropic response due to light contest with other trees, since removed. The characteristic of positive heliotropism seems to obtain to a similar degree in arbutus, wherever it is found. Prof. Jepson, ("The Trees of Cali-

fornia," Willis Linn Jepson, Ph.D., Cunningham Curtis and Welch, San Francisco, 1909, p. 203) referring to the phenomenon says:

Madroña is rarely symmetrical and the older the tree the more unsymmetrical as a rule. This is notably the case in the Mendocino and Humboldt woods, where it is invariably pushed to one side when in light competition with Douglas Fir or Tan Oak. Huge Madroña crowns, wholly one-sided, are frequently met with; sometimes the aggressive companion trees disappear and leave these irregular Madroñas standing alone. Very frequently one finds a long trunk curving out of the perpendicular 20 or 30 feet and up 60 or 70 feet to a wisp of a crown occupying a very small area of the forest canopy. Such trees are remarkable for their curving and often huge trunks, which are commonly very tall and often flattened contrary to the direction of the curve.

The curved and bent specimens of *Arbutus unedo* L. on Dinis Island, Killybegs, Ireland, figured in Plate No. 157 of "The Trees of Great Britain and Ireland," (John Henry Elwes, F.R.S., and Augustine Henry, M.A., Vol. III, Edinburgh, 1908) are presumably the result of heliotropic bending. The curves may, however, be caused by wind.

CONTINUITY IN FLOWERING.

The flowering and fruiting of the arbutus form interesting phases of its life history.

Sometimes the trees of a whole district will totally discontinue production of floral buds for several seasons, or, in the same grove, some of the trees may cease while others continue vigorous production.

During the years that arbutus does carry on activity in flowering the continuity of the operation is remarkable. Without any marked resting period, from early spring to late autumn flowering may be found in every stage; buds, blossoms, and berries. During the winter months—generally from about November to March—no fresh buds develop and the late buds do not blossom, though they continue to increase in size and advance another stage toward the blossom throughout every mild spell, until



FIG. 2.—HELIOTROPISM, *Arbutus Menziesii*, Pursh

Example of curved stem of arbutus due to former contest for light, with other trees since destroyed. Many of these odd shaped trees are to be found. Locality, Scenic Drive, Mount Douglas ("Cedar Hill") Park, Victoria district, Vancouver Island, B.C. Illustration kindly loaned by the Victoria and Island Publicity Bureau, Victoria, B.C.



FIG. 3.—CONTINUITY IN INFLORESCENCE. *Arbutus Menziessii*, Pursh.

Buds, blossoms and berries, picked from the same tree, 2nd November, 1920. Locality, Cadboro Bay, Victoria district, Vancouver Island, B.C.

sooner or later in the spring the flowering commences.

Continuity of flowering has taken place for nearly four years, without cessation, in some of the arbutus trees I have observed at Cadboro Bay and other points on the Coast. The illustration given in Fig. 3 shows the ripening berries of the earlier blossoms and the new flower buds of the autumn, picked from the same tree at Cadboro Bay, on 2nd November, 1920.

Many trees, such as willows and alders, develop catkins during the autumn, the willows of the higher and drier areas commencing in November and those of the colder swamps not until April or May. The flowering dogwood (*Cornus nuttallii* Aud.) often also has an amount of continuity in blossom. Two sets of flowers may occur in a season. Floral buds, too, can develop in the late autumn and persist all winter. To my mind, however, there is a difference between this and the arbutus, for in the latter species there is no resting period between successive periods of flowering, whereas in the willows, alders, dogwood, etc., there is.

As will be seen by the letter and table of temperature kindly supplied to me by Mr. F. Napier Denison, Superintendent for British Columbia, Dominion Meteorological Service, Gonzales Hill, Victoria, B.C., and printed below, the weather conditions have been somewhat abnormal during the last four years. Mr. Denison's idea about the tempering effects of winds blowing off tidal waters is borne out by the fact that the floral buds on arbutus trees near the shore withstood the temperatures given by Mr. Denison while those farther inland were cut off by the frosts. The dogwood also suffered inland but near the sea was uninjured.

Victoria, B.C., April 15th, 1921

C. C. Pemberton, Esq.,
Sayward Building,
Victoria, B.C.

Dear Sir:

In reply to your letter of last December and enquiry of recent date respecting climatic conditions at Victoria during the past few years, I take pleasure in enclosing you a table bearing on this subject for 1919, 1920 and to March, 1921, and monthly normals for precipitation, temperature and sunshine.

You will note from the enclosed that in 1919 the summer and winter were abnormally cold and particularly in November and December. In 1920 the rainfall was abnormally light in February while from the early summer to the close of the year it was unusually heavy; and again in January and February, 1921, the rainfall was abnormal.

I am inclined to think that why the Arbutus grows so well about Victoria is on account of the tempering effect of the winds usually blowing off the tidal waters of either the Strait of Juan de Fuca, that is, from the southwest in summer, and across the Strait of Georgia from the north in the winter.

It may interest you to know that the annual amount of bright sunshine here is more than in any part of the British Isles, even including the Channel Islands.

Trusting the enclosed information may be of some service to you,

I remain

Sincerely yours,

F. NAPIER DENNISON,
Superintendent in B. C.

(See top of page 25 for Meteorological Table.)

A REMARKABLE SPECIMEN.

The arbutus pictured in Fig. No. 4 is a curiosity. Its life history as revealed by its growth-form is an enigma. There is the long root—or stem—stretching across a pocket of soil in the top of a cliff of rock and bending at one end over the edge of the cliff and then making a curve up and out into a normal shaped tree. The cause of this very unusual method of growth is difficult to ascertain. The district in which the tree is situated is one of those settled and populated early in the history of Victoria and I enquired from the older inhabitants of the locality for any particulars of the early life of the tree but could gain no information. No one seemed to have noticed it and no data as to fires or other destructive agencies could be obtained. The appearance at "A" seems to indicate that at one time there was a vertical shoot at the point. In fact, it looks as if there had been a good sized tree and that from it a root had descended in the direction "D" toward the lower ground. If this were so, then the piece "A" - "B" - "C" would have been another root mostly on the surface but with a short portion covered with soil at "B" and hanging over the cliff at "C." As can be seen by the illustration, the stem of the tree existing at "C" when the photograph was taken really commences to be a true stem at the point "C". The stem, or root (whichever it is), "A" - "D", "A" - "B" - "C" has the appearance of having suffered great ill-usage. It is decadent throughout its length except where the small portion at "B" is covered with soil. This covered up part proved on examination to be vital and in good condition. These circumstances have led me to believe that an original stem at "A" may have become destroyed and, in consequence, an adventitious shoot had subsequently sprung from the over-

VICTORIA, B.C.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year	
1919														
Highest Temperature	52.0	50.9	62.5	67.2	68.5	70.0	84.5	89.4	81.4	67.2	55.3	52.5	84.5	July.
Lowest Temperature	33.0	27.0	32.0	36.8	39.8	42.8	47.2	47.7	42.0	31.7	29.7	15.5	15.5	Dec.
Mean Temperature	41.3	40.1	44.0	48.9	52.1	54.4	58.5	58.8	57.7	48.2	42.8	38.0	...	
Precipitation	5.81	2.75	2.22	2.90	.79	.53	.02	.34	1.35	1.30	5.53	4.79	28.33	
Hours of Sunshine	59	80	150	195	273	283	378	325	242	136	51	94	2265	
Prevailing Wind	N	SE	SW	SW	W	W	SW	SW	SW	N	N	N	..	
1920														
Highest Temperature	53.0	53.0	58.8	64.7	67.4	78.2	91.3	81.3	74.0	59.0	58.0	50.9	91.3	July.
Lowest Temperature	24.8	32.2	31.8	30.0	39.8	43.0	48.6	46.3	45.7	37.3	34.8	32.1	24.8	Jan.
Mean Temperature	39.2	41.6	43.9	45.5	49.9	55.7	59.8	61.1	55.0	48.5	46.0	42.5	...	
Precipitation	5.55	.62	2.28	1.45	1.37	1.04	1.00	1.61	3.62	4.03	3.11	4.62	30.30	
Hours of Sunshine	52	141	134	230	303	255	345	346	173	99	104	31	2213	
Prevailing Wind	N	N	SW	SW	SW	SW	SW	SW	SW	N	N	SE	...	
1921														
Highest Temperature	51.8	55.0	56.2	..	..	..	..	..	..	..	..	..	..
Lowest Temperature	29.0	27.5	30.0	..	..	..	..	..	..	..	..	..	..
Mean Temperature	40.2	41.5	43.9	..	..	..	..	..	..	..	..	..	..
Precipitation	5.55	4.28	1.23	..	..	..	..	..	..	..	..	..	..
Hours of Sunshine	58	80	174	..	..	..	..	..	..	..	..	..	..
Prevailing Wind	SE	N	N	..	..	..	..	..	..	..	..	..	..
AVERAGE														
Mean Temperature	39°	41°	44°	48°	53°	57°	61°	60°	56°	51°	45°	41°	50°	
Precipitation	4.31	3.13	2.33	1.25	.99	.85	.44	.62	1.53	2.73	4.58	4.69	27.45	inches
Hours of Sunshine	71	80	142	197	258	279	300	304	189	130	77	60	2087	

hanging root at "C". When I first saw the tree it was in fairly healthy condition but it has been failing slowly ever since, and when the photograph was secured there were only one or two branches alive. Not long after this the stem became broken off at a point a little to the right of "C".

The break revealed the fact that the lower side of the stem was alive and in a healthy condition and furthermore that it had living rootlets penetrating into the soil of the crevice. Perhaps the misshapen and fasciated appearance of the stem at "C" may be because it had originally



Photo by courtesy of the Victoria and Island Development Association

FIG. NO. 4.—A MOST REMARKABLE SPECIMEN, *Arbutus Menziessii*, Pursh
The cause of this most remarkable growth is unknown. The tree has, since the taking of the picture, died and rotted away.

been a root. Although I have never seen nor heard of arbutus throwing out adventitious shoots from roots, in the way poplars and many other broadleaf trees do, it can, nevertheless, make adventitious growths from stumps and roots under certain conditions. There are many instances of rings of shoots arising from the rims of the stumps of the huge dead pioneer arbutus trees of the isolated type once scattered over the area surrounding Victoria. Adventitious growths can also spring up at the base of the stems of the big ancient arbutus trees of the forest as soon as the competing trees are cleared away. The young growth often takes the place of the parent tree which, owing to its wisp of canopy, usually dies away. Further proof of the ability of arbutus to develop adventitious shoots from roots is to be seen when a large tree is blown over on its side but part of its root system remains in the soil. In cases of this kind, adventitious shoots are known to be thrown out by the upturned roots near the base of the stem. A striking illustration of this was noted at a field meeting of the Natural History Society of British Columbia held at "Tiswild," the residence of Mrs. McVicker, in the Highland district, Vancouver Island. A still more remarkable instance of a similar occurrence was found at "Allbay," the property of W. T. V. Copeman, Esq., near Sidney, on the Saanich peninsula, Vancouver Island. A fair-sized arbu-

tus growing in shallow soil had been blown down but the roots on one side had remained in the soil. The flat base of the stem had become upturned and had exposed its underside to light. The consequence of this was that a strong shoot sprang from the upturned lower side and when I saw the tree both the original stem and the young shoot were thriving.

Another explanation of the cause of the peculiar position and mode of growth of the arbutus in Fig. No. 4 may simply be that a seed had germinated in the crevice at "C". If this be so, the length of the root "C" - "B" - "A" - "D" is remarkable and its course and the loop and fasciation of the stem at "C" are unusual.

The heliotropic power of the arbutus may be another reason for the peculiar appearance of this arbutus. Contest for light between the arbutus and some other trees once growing together on the crest of the cliff may have induced the arbutus to creep along the ground and therefore "A" - "B" - "C" may be a stem which, in bending toward the light, had layered where it has touched the soil. Arbutus, however, so far as I am aware, does not naturally layer. Some scrub oak (*Quercus garryana* Dougl.) can be seen in the illustration near the point "A" and may be sprouts from the remains of some former large oak that once competed with the arbutus for light. Garry oak is plentiful in the neighborhood.

A PROPOSED BIRD SANCTUARY IN BRITISH COLUMBIA.

BY J. A. MUNRO, OKANAGAN LANDING, BRITISH COLUMBIA.

The notable increase in the migrations of ducks and geese, following the ratification of the Migratory Birds Convention, has given an impetus to bird-protection which is apparent wherever sportsmen or nature-lovers are gathered together. In marked contrast to the pessimism rife in the five years preceding 1918 (which, at its worst, prophesied the end of water-fowl shooting in another decade, and at best looked for its survival only as an interest vested in the owners of large estates) is the present enthusiasm and confidence in the future.

This is manifested among sportsmen by the earnest discussion of protective measures that would have been condemned as radical and visionary a few years ago. Measures for vermin control, plans for licensing that persistent enemy, the domestic cat, reduction of bag limits, etc., are questions brought up at every game association meeting.

Another expression of the popular enthusiasm

is the growing demand for Bird Sanctuaries. Unfortunately, the supply of Dominion lands suitable for sanctuary purposes in this Province is not equal to the demand—or the need. A number of property owners who control land of this type have requested, with characteristic western generosity, that such areas be created permanent Bird Sanctuaries under The Migratory Birds Convention Act, even though this restriction would mean the loss of their shooting privileges.

Swan Lake, which has been proposed as a Bird Sanctuary, is approximately three miles long and half a mile wide, its southern end being three quarters of a mile from the city limits of Vernon. The land surrounding it is of high fertility, and the greater portion is under cultivation. There is a considerable acreage in orchard, and alfalfa is grown extensively. Between the edge of cultivation and the lake shore is a fringe of brush, chiefly alder, willow, mountain birch, and black haw, and in several places on the east shore there

are poplar and alder stands, several acres in extent. The fore-shore is boggy and alkaline for the most part, with infrequent stretches of narrow sandy beach. Where the lake bottom is sandy, bog rush is the chief aquatic growth, but in the muddy portions there is a heavy growth of tules, several hundred yards wide in some places. The marsh area is widest at the north end of the lake and is intersected by several weed-choked lagoons. The lake is shallow, probably not exceeding eight feet in depth, and is fed by two small streams, one at each end. The only outlet is a small stream at the north end, which joins Long Lake Creek near Vernon.

Trout are said to have been plentiful at one time, but none have been caught within recent years. There is, however, an abundance of *Cyprinoids* and several species of larger coarse fish, which supply the needs of Loons, Ospreys, Kingfishers and other fish-eating birds.

This shallow lake with its encircling marsh is probably more prolific in bird life than any other lake of its size in the Okanagan Valley. The growth of marsh plants, thriving in the warm water and drawing vitality from the decay of past years, is amazingly rapid, and fortunately the carp, which are reducing the marshes in the lakes of the Okanagan chain, have not yet made their appearance.

On a day in June, this expanse of waving green and the air above it fairly hum with insect life. The water, too, is alive with little fish, with crustaceae and with the larvae of the insects that swarm on the plants above. To this endless banquet come the birds in their hundreds. Marsh Wrens peer from the tule clumps and burst into ecstasies of song; Black Terns skim past, barely clearing the tule tops; Coots, Red-heads and Ruddy Ducks swim by in friendly unconcern, while a never-ending procession of Swallows and Red-winged and Yellow-headed Blackbirds fly back and forth. This is accompanied by an almost deafening volume of bird voices, the clamor of Black Terns, chuckling of Coots, rasping of Yellow-heads, the yelping of Holboell's Grebes, the pumping of Bitterns and, cutting through this medley like a knife thrust, the wild, valkyrie call of the Loon.

The fringe of brush along the shore is also alive with birds—Eastern and Western Kingbirds, Western Wood Peewees, Alder Flycatchers, Crows, Bullock's Orioles, Sooty Song Sparrows, Red-eyed Vireos, Yellow-throats, Yellow Warblers and a dozen other species—no stretch of woodland of whatever fertility could support this wealth of bird-life. The North Arm of Okanagan Lake, only a short distance away, is of the same general

character—shallow water and marsh-bordered shores—yet it supports a much smaller and less diversified population.

The boggy tule-lined shores and the weedy stretch of water are often viewed with hostility, and at one time a scheme for draining the lake was contemplated. Fortunately this vandalism was abandoned and it is to be hoped that such an exceptionally attractive breeding-ground for water-fowl will be left in their undisturbed possession for all time to come.

The following notes were made during the summers of 1916 and 1918 when I spent several days exploring the marsh and studying the birds breeding in it.

HOLBOELL'S GREBE: *Colymbus holboelli*. On May 15th, 1916, flocks of Holboell's Grebe were seen in the open water chasing one another with a great deal of splashing, and calling in chorus. Their courtship is a rough and tumble affair, consisting chiefly on the part of the males in a display of pugnacity towards others of their sex, and, on the part of the females, of a waiting attitude. There is none of the graceful posturing and display-flights that make the courtship of the more highly organized diving-ducks such a delightful spectacle.

A partial exploration of the marsh three weeks later brought to light twenty nests, some only recently completed and empty, others containing from one to four eggs. The nests varied slightly in size, but otherwise were identical—sodden masses of bog rush, black with a season's decay, floating with the larger portion below the surface. Generally, they were moored in a clump of rushes and, in most cases, close to the outer edge of the marsh where the water was from two to four feet deep. My noisy approach through the rustling tules was sufficient to alarm the sitting bird and she or he (as both sexes help in the work of incubation) would slip off the nest and glide through the tules to the open water without being seen. Usually the mate was not far off and, together, they would swim back and forth in front of the nest, some thirty or forty yards from the marsh. Frequently, the sitting bird had had sufficient warning to cover the eggs with some of the loose material on the nest, and in only a few cases were they found exposed.

Usually, they were embedded in the rotting material composing the nest and, no doubt, the heat from this source assisted materially in their incubation.

One bird, apparently a female, was seen with a single youngster riding on her back. Perhaps the rest of the brood had been killed by muskrats as several partly eaten bodies of downy young

were found in the marsh.

These Grebes did not breed in colonies, but each area of marsh contained its quota of nests, and, generally, they were thirty or forty yards apart. As only a small portion of the lake was visited, a correct census of the birds could not be taken, but it was estimated that seventy-five pairs were breeding.

Two years later, June 22nd, 1918, the number had been greatly reduced. During the autumn of the previous year there had been a considerable mortality through a parasitic disease which may explain their relative scarcity in 1918.

PIED-BILLED GREBE: *Podilymbus podiceps*.

These were less common and much less in evidence than the last. Sitting birds would steal away from their nests without being seen and did not show the solicitude for their eggs that marked the behaviour of the larger species. A nest containing seven eggs and another with one egg were found on May 15th, 1916. The nests were smaller than the Holboell's, but built of the same material in similar situations. In both nests the eggs were completely covered. Another nest, containing eight eggs, was found on June 8th, 1916, and the covering of wet weeds was removed, leaving the eggs exposed. Upon my return to the nest twenty minutes later, it was discovered that the bird had returned in the interval and had covered the eggs again.

Two nests, similar to the last, found on June 22nd, 1918, contained three and five eggs respectively and the birds were seen gliding through the rushes with only head and neck above the water. These were the only occasions on which I was able to obtain a glimpse of the birds as they left their nests.

LOON: *Gavia immer*. A pair seen on June 8th, 1916, were swimming back and forth in front of a marshy point in one of the lagoons at the north end of the lake. Their nest was quite close but impossible to reach without the aid of a boat. Two other pairs were seen at a distance in the open water. On June 22nd, 1918, two downy young were in the same lagoon. They dived through the matted weeds on the surface, appeared for a moment farther on, and then vanished in the thick tules while the parents called to them from the open water fifty yards distant.

BLACK TERN: *Hydrochelidon surinamensis*.

Finding a breeding colony of Black Terns was a decided surprise. I had no record of their breeding in the Okanagan Valley and had known them only as scarce migrants. When I was approaching the marsh on May 18th a band of thirty or more were seen flying over the lagoon, and, as I neared the water's edge, they flew to-

wards me, circling over my head with cries of alarm. A thorough search of the marsh was made for nests, but nest-building had not started. Three weeks later, on June 8th, the birds had started laying and a number of nests contained one or two eggs. Most of these were on a floating mass of dead rushes which had drifted into the lagoon and lodged against the tules. In a few nests a scant lining raised the eggs above this floating mass of debris, but the greater number consisted of a simple arrangement of dead rushes, barely sufficient to keep their contents from rolling out. In the play of light and shadow diffused through the tall encircling tules, nests, eggs and the immediate surroundings blended so harmoniously that many nests would have escaped observation had it not been for the excited cries of the parents as they wheeled low over the nesting sites. Several nests, and these were conspicuous, departed from the usual in being made of fine reddish roots of some water-plant, probably brought to the surface by a muskrat. One bird was seen brooding eggs on a small piece of floating debris in one of the deeper portions of the lagoon and she remained there quietly while I watched at close range—close enough to see the maroon-colored gape and the gentle brown eye.

While I was wading through the tules, the Terns flew around me on all sides, often within arm's length, and were quite devoid of fear in their parental solicitude. Often three or four birds, following each other closely, would fly straight towards me until within a few feet, when they would rise slightly and pass over my head, to circle back and repeat the manoeuvre. While the birds were frequently all in the air at the same time, they turned and wheeled or dropped out of sight behind the tules so quickly it was impossible to count them. Ten nests were found, but it is thought the colony numbered twenty pairs at least. The breeding ground was restricted to an area about two hundred yards square at the north end of the lake.

When I visited the marsh next, on June 22nd, 1918, the Terns were in the same place and the colony was larger. The floating masses of rushes were again in position and afforded the chief nesting site. With the increase in the number of birds, the nests had been built closer together and in several places four or five were in sight at one time. Twelve nests were examined, the majority of which held three eggs, the maximum number.

CINNAMON TEAL: *Querquedula cyanoptera*.

Three drakes and two ducks were seen swimming close to shore on May 18th, 1916, and on June 8th, 1916, two drakes and one duck were seen together. It is probable that they were breeding

but I was unable to find a nest. This species is uncommon in British Columbia and these were the first I had seen in the flesh.

REDHEAD: *Marila americana*. Redheads were in small flocks performing their courtship antics on May 15th, 1915. On June 8th, the majority were paired, but one band of seven drakes and five ducks were still in the courtship stage. The mating period is probably of longer duration with this species than with any other duck. I have seen them courting and actually copulating as early as February 28th, and it is doubtful if eggs are ever laid earlier than the first week in June.

Only one nest was found on June 8th and this contained four fresh eggs. The nest, a deep hollow on the side of an old muskrat house, was well lined with dry tules, and screened from view on all sides by a rank growth of tules. While I was examining the contents the parent birds, flying close together, passed overhead within a few feet.

On June 22nd, 1918, three nests were found and all the birds seen were in pairs. The first nest, containing two eggs, was a slightly concave platform of mixed dry and green rushes, measuring twelve inches in diameter and placed at the base of an isolated clump of bog rush. The top surface of the nest was eight inches above the water and perfectly dry. The second nest was in the thick patch of tules and from the nest to the open water twenty yards distant led a well trampled trail. This nest was a flat platform of dry rushes, sixteen inches in diameter, resting on a springy mass of dead vegetation which raised it well above the surface of the water. It had been deserted for some reason; possibly the female had been killed on the nest by a muskrat. The nine eggs were scattered over the nest, two had rolled out and two others were broken. It was found, on preparing them, that four contained dead embryos; two were fresh (that is, they had not been incubated) and one was infertile. Possibly the two fresh eggs had been laid by a second female. A third nest, containing eight eggs, was discovered twenty yards farther on in the thick tules. This was evidently a second laying as the nest was a very flimsy affair. The slight platform of rushes was not thick enough to prevent the marsh water from seeping in and several of the eggs were lying in the water. No down had been added to any of the three nests. One brood of six downy young was seen on the same date. The female led them from the protecting tules and half swam, half flew along the surface of the lagoon and out to the open water.

RUDDY DUCK: *Erismatura jamaicensis*. On

June 8th a band of ten Ruddy Ducks was seen in a small pond in the tules. The six drakes, with burnished copper backs and broad pale blue bills were conspicuous objects on the black water. Resting placidly on the surface of the pond they appeared as if submerged lower than other diving ducks; heads were carried well back between the shoulders with no neck showing and tails were stiffly erected at right angles to the body. I watched for half an hour in the hope of seeing an exhibition of their courtship display, but the drakes remained utterly indifferent, occasionally dabbling their bills in the water or preening their feathers.

Two fresh eggs, undoubtedly belonging to this species, were discovered buried in the decomposed vegetation on the side of a muskrat house. There was no sign of a nest, the parents were not seen and I am at a loss to explain their peculiar situation.

AMERICAN COOT: *Fulica americana*. Next to the Red-winged Blackbird, this was the commonest bird at the lake in 1916 and it was estimated that two hundred pairs were present. The nests were made of dry, flat tules, securely based in a clump of tules or bog rush and high enough above the water to insure dryness on the upper surface. They varied considerably in size, but the average nest measured twelve inches in diameter and was sufficiently concave to prevent the eggs from rolling out. The number of eggs in a clutch varied from six to eleven. Several of the eggs were pipped in one nest and the scarlet bills of the chicks could be seen through the openings. On June 8th, two broods were seen, little flame-colored balls swimming in close formation after their mothers.

The sitting females showed little fear if disturbed from their nests, swimming to the open water in their leisurely fashion with head swinging back and forth to an accompaniment of unmusical clucks and gurgles and, as soon as the coast was clear, they would swim back to their nests. Evidently, they live in the closest harmony with the Holboell's Grebe, as it was usual to find the two species nesting within ten or fifteen feet of each other.

YELLOW-HEADED BLACKBIRD: *Xanthocephalus xanthocephalus*. Until the first trip to Swan Lake, my acquaintance with this handsome Blackbird was only a casual one; I had seen wandering couples in the summer and occasional migrants in the spring. On July 28th, 1914, a flock of perhaps forty, nearly all adult males, alighted in a bunch of rushes on the shore of Okanagan Lake and clung for one exciting moment to the slender stalks which bent beneath their

weight. They rose in a body, crossed the lake in a compact flock, and did not appear again.

Apparently they leave their breeding ground at Swan Lake after the young are fully fledged and seek new feeding grounds. While I was driving past the lake on July 23rd, 1915, a large flock of moulting adults and juvenals accompanied by an equal number of Redwings was seen in a row of trees along the roadside. From there they flew to an open grassy hillside, evidently hunting for grasshoppers. It was with keen expectation, therefore, that I looked forward to the following summer when I could hope to find them at home on their breeding ground.

In the chorus of bird voices that greeted my ears on reaching the marsh, the harsh, unmusical mating song of the Yellow-head was the most insistent. The males clung to the swaying tules within a few yards of the shore and when disturbed would fly to the top of the nearby willows, while the females kept hidden in the tules for the most part. Preceding the rasping song, there is a plumage display that shows off the contrasting black and yellow to the best advantage. In this rather grotesque performance the shoulders are elevated, the head lowered and the feathers puffed out, greatly exaggerating the performer's size. Then the unpleasant bray comes as if ground out by main strength, and, at the conclusion, the bird collapses into his sleek handsome self again.

On this date, May 16th, nest-building had started, but no nests containing eggs were discovered. On June 5th, a dozen nests containing from two to four eggs and several others with nestlings were found. The Yellow-heads nested in small groups of three or four pairs each, often close to a pair of Redwings, with whom they seemed to dwell on neighbourly terms. The Yellow-heads' nests

were slightly larger than those of the Redwings and were invariably lined with flat pieces of tule fibre, which always served to distinguish them, as the Redwings used coarse grass for lining. They were firmly woven in a clump of stiff brown tules of the previous year's growth and generally fastened to the stoutest part of the stalks, one to two feet above the surface of the water. The eggs showed a wide variation in size, shape and markings.

No attempt was made at taking a census, but it would be safe to place the breeding population at thirty pairs. Two years later, on June 22nd, this was at least doubled. Nests with fresh eggs and others with nestlings of various ages were found.

NORTHWESTERN REDWING: *Agelaius phoeniceus caurinus*. These are the commonest birds at the lake and they raise two if not three broods during the season. On May 15th were found nests containing fresh eggs and others containing young, from the naked stage to those almost ready to fly. On June 8th conditions were much the same and fresh eggs were noted as late as June 22nd. The nests are in no way different from those of the type form and the eggs show the same wide range of size and markings.

INTERIOR TULE WREN: *Telmatodytes palustris plesius*. The globular loosely woven nests of this species were a feature of every patch of tules, and the tireless little architect was always to be seen or heard. The occupied nests were softly lined with bullrush-down, and the eggs were piled one on top of another. The unlined cock-nests outnumbered the occupied ones in the proportion of six to one. Often three or four were seen within a few yards, probably all built by the same bird as an outlet for his superabundant energy.

THE MOUNTAIN BEAVER (*Aplodontia rufa*) *

BY KENNETH RACEY

The following notes have been made during the past three years and have now been combined in this paper in the hope they may prove interesting and assist in fuller knowledge regarding a curious and little known animal, the mountain beaver. Sewellel, boomer or ground hog, as it is variously known.

Large and increasing colonies of these creatures are to be found within a comparatively short distance of Vancouver, where they live in peace

and quietness, seldom disturbed or indeed seen by man, owing to their being nocturnal in habit, coming out at dusk to feed and retiring again to their burrows at daybreak.

Resembling the muskrat at first sight, but without the long bare tail, they are not easily mistaken for any other animal. The fur resembles more closely that of the true beaver (*Castor fiber*) than that of the muskrat, (*Ondatra zibethica*). As a matter of fact, the mountain beaver, although not closely related to any existing rodent, is allied to the squirrel tribe. The ears are small

*Read before The Vancouver Natural History Society, 1921.

and round and the tail very short, being only three-quarters of an inch in length and covered with fur. The name "boomer" was given to these animals from the peculiar booming noise made at night.

They are found only on the eastern and western slopes of the mountains of the Pacific Coast in Canada and the United States of America. So far, the most northerly record for these animals is the Fraser Valley, thence they extend southerly to northern California.

These animals have been known to climb trees a few feet in search of food, but, judged from the structure and short hind legs, they cannot be very expert climbers.

They travel considerable distances from burrows and have frequently been caught in traps set in sloughs for muskrats. They have been found living at an altitude of 3,000 feet, near Coalmont, B.C.

After removal of the skin, the body resembles that of the mole more than that of the muskrat, woodchuck or squirrel. The joints are loose and flexible, and all parts of the head, neck, body and legs are encased in tough, powerful muscles. The neck is extremely short and so heavily covered with muscles that in diameter it is the same size as, or larger than, the head. The shoulder blades are situated only one-half or three-quarters of an inch distant from the base of the skull, so short is the neck. The skull is flat and broad, and the lower jaw attached by powerful muscles. The bones of the hind legs are short for the size of the animal and from the muscular development it would appear they are much less used than the strong fore-legs which are used in digging the wonderful tunnels these animals are known to make. The tail is very short, being not more than three-quarters of an inch to one inch in length, and is curved upwards like that of the rabbit or hare. The eye is dark in colour and small in size, the eyeball measuring only 7-32 to $\frac{1}{4}$ of an inch in diameter, indicating a dark-loving animal. The claws are long and strongly made for digging in the earth. The skin is loosely attached to the body as with the marmot. Two small scent bags are situated at the base of the tail and from these a peculiar musky scent is produced when the animal is disturbed or excited. The weight of an adult mountain beaver runs from two to three pounds, but this weight will, of course, vary with the season, as these creatures are fatter in the fall than in the early spring. The teeth, which are strong and chisel-like, are used in the same manner as are those of the ordinary beaver in cutting brush, sticks, roots and salmonberry canes for food, and for gnawing

through roots, etc.

When walking about in the vicinity frequented by the mountain beaver one may be surprised, when least expecting it, by the sudden sinking of the foot into the ground for a distance of six or eight inches; on examination, it will be found that this is caused through having trodden on top of a mountain beaver burrow when it has approached close to the surface of the ground. If the burrow is followed for any distance, it will be found to twist and turn in an extraordinary manner, usually keeping from four to twelve inches under the surface, but, in some instances, running to a depth of from three to six feet. The burrows are about six and a half to seven inches in diameter and run for great distances, with openings every few feet. After careful study, examination and excavation of numerous burrows, I have been led to the conclusion that they are so constructed for a dual purpose; firstly, to secure ready access to food supplies and feeding grounds and, secondly, to enable them to escape more easily from their enemies, the marten, mink, skunk, owls and other creatures which apparently feed upon these animals when opportunity offers. In nearly every instance when the burrows have been examined and traced, it was found that they started from a ravine in which a creek flowed, a slough or other damp place where there was a constant supply of fresh running water, and the lower tunnels are so constructed as to be the outlets for little trickling streams of water; in some cases, carefully made canals have been placed to guide the course of the water from the mouths of the burrows. Apparently water and plenty of it is essential to the well-being of the mountain beaver, as it is found only in regions where water is abundant and easily obtained. Mountain beavers are only semi-hibernating, and, while they do not come out much in the winter time, yet they have an abundant underground fresh-water supply, no matter how cold the weather or how deep the snow may be. Far down in their subterranean chambers they live during the cold months amply supplied with water and food. From December until March, they are sluggish and do not come out of their burrows very much; in some instances they have been known to block up (late in the fall) some of the entrances to the burrows.

In one set of burrows examined, a portion in an area of 50 x 50 feet contained sixty-eight entrances to burrows, and, farther down the mountain in a ravine, these burrows had no less than six outlets out of which streams of water poured. One of these I found only through hearing the water gurgling underground, and, on

digging down to a depth of a foot or fifteen inches, found a stream of water an inch and a half deep running through the burrow.

The nesting and storage chamber from which several burrows radiate is usually an enlargement of the burrow to about 12 x 15 or more inches. Here the food is stored for winter use and it is here the young, numbering from two to four, are brought forth in the month of April. The young are born blind.

These animals do not retire high up the mountains at the approach of cold weather as is generally believed, but, as before mentioned, they frequently den up for a portion of the winter.

These creatures are gregarious, several pairs living in the same network of burrows. At the same time, all the specimens I have secured so far show traces of severe fighting, the skins being badly scarred. It is possible some of the many scars were caused by birds of prey or other enemies.

The mountain beavers are very cleanly in habits and keep the burrows clean of refuse, dirt and old unused, decayed food supplies. One burrow was followed for several hundred feet and eventually, at a depth of between four and five feet, the storage and nesting chamber was discovered. This chamber measured about 9" high x 14" wide x 40" long. The northerly part for the first fifteen inches was raised high and was dry, and here the nest of sticks and moss was placed. The rest of the chamber was lower and half full of water. This subterranean reservoir was well made, the bottom being covered with hard sand and small gravel so compact that the water could not escape; the whole upper part of the chamber was smoothly coated with earth or mud as if the animal paid particular attention to keeping everything neat and smooth.

Three burrows led in different directions from this chamber.

The food of mountain beavers consists very largely of the canes of salmonberry and wild raspberry which they cut into pieces three or four inches in length and store in their food chambers for winter use. They also eat the green moss which is found growing over fallen trees and logs, as well as the bark of maple trees, and they seem to be especially fond of the "Scotch Cap" leaves and canes. They eat the seeds of the maple, remains of which I have found in their burrows. In one instance, a piece of fungus was found stored with the other food. They are fond of potatoes, carrots, parsnips, cabbages, cauliflowers and other vegetables of all kinds, and are most destructive once they become acquainted with a garden patch. At Yarrow I once found that the mountain beavers had completely eaten up a row of rhubarb. This is worthy of note, as few animals care for rhubarb. One mountain beaver, which I had in captivity for a short time, would eat nothing but green moss and apples, altho I tried it with several kinds of vegetables. They store up fern-roots, leaves, grass, moss, red willow and currant-bush and feed also on the roots of these two latter. As they are nocturnal, they feed and gather their food supplies at night.

Only recently I heard of a rancher finding a quantity of his cabbage and cauliflower neatly cut and stored away by these animals.

In summer time I have frequently noticed little piles of the mountain beaver "hay" lying at the mouths of the burrows, drying and curing before being taken into the storage chambers. These little piles of food are very neatly placed with the butts all pointing one way.

THE "JAPANESE STARLING" IN VANCOUVER, BRITISH COLUMBIA.

By J. A. MUNRO, OKANAGAN LANDING, BRITISH COLUMBIA.

Visitors to Vancouver with an interest in ornithology, are attracted by an odd-looking, glossy black bird with conspicuous white wing-bars and a curious crest curved forward over the base of the yellow bill. This is a species of *Mina*, *Acridotheres cristatellus*, known locally as the Japanese or Chinese Starling.

Nothing definite is known regarding the introduction of this species to Vancouver. One story has it that a large wicker cage containing a number of these birds, consigned to a Japanese resident, was broken open in transit from one of the Oriental liners and the birds escaped. Other stories are

to the effect that its introduction was deliberate. For some unknown reason, this *Mina* is prized as a cage-bird by the Japanese, probably for pleasing qualities that are not perceptible to the occidental mind. But, whether their introduction was the result of accident or of design, is of little interest; the important point is, that they are now well established and an acquisition of doubtful value to our avian fauna. The increase of this species has not been as spectacular as was that of the House Swallow, but within the last few years it has been steady and they are gradually spreading from Vancouver into the rural districts. In

common with the House Sparrow, they frequent the city streets in order to feed on the undigested grain in horse-droppings. The curtailment of this food supply that followed the change from horse-traffic to motor-traffic no doubt served to check their increase as it has also reduced the Sparrow population.

They are gregarious to a marked degree and, like the European Starling, show a preference for certain roosts. Small bands forage in the city streets and suburban districts during the day and towards evening gather in large flocks to spend the night under the eaves of certain public buildings in the heart of the city. Their arrival at these roosts is attended by much brawling, jostling and discordant chattering. Neither their manners nor their voices are commendable, although the latter are modified to some extent by a mellow whistling note of a rather pleasing quality. Of these roosts the most important is situated at the corner of Cordova and Carroll Streets, where several buildings provide shelter for a large proportion of the urban population. Other roosts, scattered through the suburbs and the adjacent rural districts, contain a relatively small number of birds. Marpole, conveniently near the fertile farms of Sea Island, is well stocked and New Westminster at present is the farthest outpost of colonization.

From an aesthetic standpoint, the Japanese Starlings have little to recommend them. Their economic status has still to be determined and, as they are aliens adjusting their habits to an unfamiliar environment, any remarks in this connection can only be tentative and subject to future revision. They have their advocates as well as their accusers and for the present they must be kept under surveillance.

The accusations brought against this species are in reference to habits that are also ascribed to the European Starling. Like the last-named and that other quite undesirable alien, the House Sparrow, they are said to oust some species of our native birds from their long established nesting sites, forcibly evicting the rightful tenants. One observer complained that a Japanese Starling

had removed fledgling Blue-birds from their nest with his bill and dropped them to the ground. At Marpole, I noticed several Starling nests in old Flickers' holes that ordinarily would have been occupied by Tree Swallows or Blue-birds. It is also stated that they are destructive of small fruits in the rural districts.

On the other side of the ledger, their defenders claim that tent caterpillars are eaten to a great extent and if this is so, it would be a palliation of their objectionable qualities. In this connection, however, it is well to remember what claims were made for the House Sparrow in the early days of its history in America as a check on injurious caterpillars. In the analysis of 10 Starling stomachs taken during the month of June, when the tent caterpillar plague was at its height, there was no evidence that any of these had been eaten. This, of course, is not proof that they are not eaten, and a much larger amount of stomach material would have to be examined before a conclusion could be reached. In all the stomachs examined, vegetable matter was present in excess of animal matter. The former included unidentified fruit pulp, raspberry and service berry seeds, oat husks and leaf fragments, while the latter consisted of the remains of spiders and insects of several orders. Among these were house flies, a larva of a large coleoptera and adults of smaller species, an orthopterous insect in the nymph stage and one millepede.

The importation of foreign species of birds serves no useful purpose and may result in disastrous consequences to our native birds. There have been several attempts to introduce European song birds into British Columbia, chiefly for sentimental reasons, but in part fostered by the erroneous belief that native bird-life is scarce. Bird-lovers in British Columbia may take comfort from the fact that over one hundred and thirty insectivorous and weed-destroying birds are found within the boundaries of the Province. Fortunately, The Migratory Birds Convention Act prohibits the introduction of any species of Migratory Birds without written authority and such activities will be under control in the future.

THE DUCK HAWK

BY E. BEAUPRE, KINGSTON, ONT.

During the years that I have been interested in birds, I have had under observation two pairs of Duck Hawks, *Falco peregrinus anatum*. One pair occupied the ledge of a granite cliff overlooking a small lake in one of the most picturesque parts of the lake section of Leeds County, Ontario.

From the most careful and persistent investigation I was able to trace the habitation of this particular pair for a full half century. Through visiting this lake section at different times, I was able, with the assistance of a settler, to secure many interesting facts concerning the home life of these

birds.

They arrive at the cliff, mated, about the middle of April, and a full clutch of eggs has been laid as early as April 23 (1903). This was an unusually early date, as May 1 is about the average date to find the eggs of this species.

While these hawks inhabit a cliff for many years in succession, they have the habit of changing the location of their nesting site each year. A most inaccessible part of the cliff is selected for the rearing of their young, making it difficult for the curious to intrude or trespass on their sacred territory. Their habits and conduct are regular, firmly fixed and subject to little variation.

The male falcon selects a rampike, usually a short distance back of the cliff where his home is fixed, and this is used as a look-out station or observation post; when not away on a foraging expedition, he here maintains a constant vigil.

The female attends to all the domestic duties of the falcon home, but is spared the task of seeking for food. This is the duty of the male who never fails to secure an abundant supply. During the period of incubation he is particularly attentive in the matter of feeding his mate. The food secured consists in the main of birds, which they capture alive in true falcon style.

Anxious to secure a set of photographs of the young hawks in the development stages of their lives, I visited this particular cliff in the month of June one year. Instead of finding, as I anticipated, a brood of healthy and vigorous fledglings ready to be brought into the field and scope of the camera, I was greeted by the sight and unpleasant odor of four addled eggs. While disappointed in the main object of my long trip and expectations on this occasion, I was privileged to witness a phase in the life of this particular species which I had not previously seen or known from observation and which compensated me for my journey and efforts.

In the vicinity of the addled eggs, the cliff was covered with the remains of the feasts of the falcon family. Distributed over the entire surface I saw regurgitated pellets very similar in size and shape to some that I found near the nest of a Short-eared Owl in Cataraqui marsh a few years ago. On close examination, I found that the pellets contained hair and feathers and the small skulls and teeth of the small short-tailed field voles (*Microtus pennsylvanicus*). At the foot of the cliff were the bodies of two young ground hogs (*Arctomys monax*) which had been killed by the falcons, but had not been used for food. In all my experiences with these hawks, this was the only occasion on which I found any evidence to prove that mammals constituted any part of

their food. I am now satisfied that mammals form a very important part of the food of the falcon.

The mechanical or constructive faculty is evidently absent in the falcon as no attempt whatever is made to build a nest, the eggs being deposited in the loose clay which forms the capping of the cliff where they select their habitation. Not infrequently the clutch contains one or more addled eggs. On two occasions I found the entire clutch addled.

When the young falcons are hatched, they are well covered with a soft white down and are able to toddle about shortly after they leave the shell. The lives of the parent hawks are evidently in constant jeopardy. This is no doubt due to the fact that they fall victims to the gun of some farmer who has suffered from their destructive propensities.

A few days after the arrival of the falcons at the cliff in 1914 (April) one of the parent birds disappeared, but the unmated one remained in the vicinity of the ledge until September. In the spring of the following year the single bird returned alone to the old home, where it remained a few weeks, then disappeared never to return to the place where the loss of its partner was sustained.

When the eggs of the falcons are taken they do not lay again the same year, but do not leave the locality until the proper time for their migration, returning at the usual time the following year. In 1918 a most delightful and profitable opportunity came to me in a part of Frontenac County which made it possible for me to continue my observations of the falcon. The conditions were more favorable than on my previous expeditions. In 1920 I secured a set of photographs of the young falcons, and was able to identify the feather remains of the birds which had fallen victims to the rapacity of their parents.

On one occasion, I found falcon eggs in a most unusual location. They were laid among ferns close to some silver birch saplings on the open ground on the top of a cliff. This clutch of eggs is now in the collection of the Rev. C. J. Young, M.A., Brighton, Ontario.

Apparently the development of the young falcon is phenomenally rapid. Different writers on ornithology whose works I have read are united in stating that the period of incubation is one month. I am satisfied the period must be somewhat shorter, probably about twenty-one days. Later on, I hope to be able to settle this question with a greater degree of accuracy. On June 14 I found the young hawks with a heavy growth of white down covering their bodies and completely enveloping the feathers. On visiting

the same brood a week later (June 21) I found that the soft down had disappeared and the plumage was uniformly a rusty brown with black markings. On my approaching the young birds, they objected to my intrusion in loud voices and gave every evidence that my visit was an unwelcome one. But I was there for a purpose, and not even the menacing claws of the parent bird were going to rob me of my intent with the camera.

I found on this visit the shelf of the rock carpeted with the feathers of the bird victims of the falcons which had been used to feed their voracious off-spring. The face wall of the granite cliff was a scene of carnage stained with bird blood, indicating that a sort of "Belshazzar's feast" had been conducted on the spot. Rich booty had been brought from field and farm and slaughtered for consumption. The odor from the decomposing parts that remained uneaten was far from pleasant on a hot summer afternoon. Flies swarmed about the decaying and decomposed victims of the falcon feast, and, having accomplished the chief purpose of my visit, I departed.

Through the assistance of Dr. Fisher and Mr. P. A. Taverner I was able positively to identify the following victims of the falcon slaughter:—Black Duck, Green Heron, Florida Gallinule, Killdeer, Ruffed Grouse, Nighthawk, Blue Jay, Black-billed Cuckoo, Meadowlark, Scarlet Tanager, Brown Thrasher, Flicker, domestic fowl, such as half grown Plymouth Rock, and one undetermined. It will be seen from this list of victims that the Tanager is the smallest bird to attract the attention and tempt the appetite of these hawks.

On the date of my last visit, June 21, the young hawks, judged by their unusual vigor and activity, fully intended to take flight on my approach, which two of them did, the third member of the family being prevented from following the example of the rest by having a canvas smock thrown quickly over its head.

At times these Falcons appear to live on friendly terms with their bird neighbors, and, ludicrous as it may seem, on one occasion an old disreputable Crow disputed possession of the top branches of a look-out tree with the hawk. On different occasions I have observed and recorded Spotted Sandpipers, Kingfishers, Grackles and Tree Swallows living and rearing their families within the shadow of the cliff home of the falcon.

On the wing the falcon is swift and graceful and one is amazed at the speed with which the female catapults from her shelf with a downward thrust to meet intruders, uttering her cackling notes which echo warning along the line of cliff in the early hours of the morning. During the long years of life which one may devote to the interesting study of bird life, many delightful incidents may occur, but climbing a cliff full of difficulties and dangers in order to discover and examine a rare bird's home and its contents has compensations sufficient for the most enthusiastic ornithologist, and I shall always cherish deep in the recesses of memory my experiences in securing these data concerning the Peregrine Falcon.

My latest visit to the home and haunt of the Duck Hawk was on June 9 of this year (1921); except to confirm my previous observations I did not see or become familiar with anything new. Two young hawks were hatched from three eggs, the addled egg still being in the nest. The rock ledge was profusely strewn with the feathers of the victims of the parent hawks, consisting of Black Ducks and Scarlet Tanagers, with a Belted Kingfisher added to the list. The young hawks looked snug and comfortable in their thick covering of white down. The development was so rapid that I received information by June 29 they were strong enough to take flight.

In a crevice of the granite rock about ten feet above the home of the hawks, a pair of Phoebe had built their nest, and, in the midst of all the carnage created by the hawks, the mother Phoebe was tenderly caring for her little brood.

PRESERVING ORDER IN A BIRD SANCTUARY

BY J. A. MUNRO, OKANAGAN LANDING, BRITISH COLUMBIA

The bird sanctuary of the following article is of modest proportions and has no official status under the Migratory Birds Convention Act. It is a garden sanctuary comprising several hundred square yards of orchard about my house and a small patch of brush on the shore of Okanagan Lake. In this small area there is a normal population of about fifteen pairs of birds of the

following species: Eastern and Western Kingbird, Western Wood Pewee, Chipping Sparrow, Cedar Waxwing, Yellow Warbler, Tree Sparrow, House Wren, Mountain Bluebird and Robin, and the maintenance of order amongst this varied population occasionally demands that rather drastic measures be taken.

The Robin is usually a welcome boarder. No

objection is made to his inroads on my cherries as he more than pays for this destruction by the number of cutworms he consumes in the spring, and one philosophically reflects that acid food is no doubt essential to his internal economy after a steady diet of insects; and perhaps this desire for fruit is analogous to the craving of the woodsmen for green food after a winter diet of salt pork. But once, for the good of the colony, I had to destroy a pair of Robins and their brood. Before relating this episode it will be necessary to sketch the contemporary history of a pair of Western Wood Pewees.

In the summer of 1917, a pair of these birds built their dainty nest on a nearly leafless branch of a small plum tree beside my front door-step and in due course three cream, umber-spotted eggs were laid. It was the first time Pewees had built so close to my house and I was greatly interested. The nest was six feet above the ground and could plainly be seen by one sitting on the verandah. During the first week while the eggs were being laid, the Pewees would fly out when one walked along the path beside the nesting tree, clicking their mandibles together in protests at the intrusion. "gritting their teeth," as one observer humorously put it. It was not long, however, before they became reconciled to their human neighbors and then, at close range, one could watch the female, sitting tight on her eggs, indifferent to the close inspection, while the male, in a nearby tree, drooped his tail, flycatcher fashion, and showed as little concern. Then one morning the eggs were gone—who was the culprit? Squirrels and chipmunks had been killed off years before. Magpies and Crows gave my garden a wide berth; could it be traced to the nocturnal activities of white-footed mice? There seemed no satisfactory answer.

The following year the Pewees returned to the orchard, again built their nest on an exposed branch of the plum tree and as before, laid three eggs therein. Now, under the eaves of the house a few yards from the plum tree there is a small bird-house usually tenanted by Tree Swallows, and on its flat top a pair of Robins had built a nest and raised their young during the summer of 1917. These birds also returned the following year and used their old nest on top of the bird-house. Shortly after three eggs of the second setting had hatched and the Pewees' eggs were about seven days advanced in incubation, I was sitting on the verandah steps in the evening dusk relating this Pewee story to a friend when one of the Robins was seen to fly into the plum tree. Immediately there was a commotion of rustling wings and snapping mandibles. The Pewees

had savagely attacked the Robin and he fluttered to the ground with the Pewees in close pursuit. In a few moments he returned to the tree and hopped along the branch on which the Pewees' nest was built until he stood directly over it, while the Pewees protested from a distance but did not attack again. We waited in breathless excitement for the Robin's next move, and to our astonishment, he deliberately pierced one of the eggs with his bill and carried it to the ground where, under a shower of clods, he was forced to drop it. The egg was found intact, save for the puncture made by the Robin's bill. This seemed a clear case against the Robin and the family was condemned. Unfortunately, the sentence could not be carried out that evening, and on the following morning the two remaining Pewees' eggs were gone.

In this garden-sanctuary, the smaller species of birds, other than those that build in nesting boxes, are the victims of some enemy that takes at least fifty per cent of the first setting of eggs. On one occasion, I counted seven nests that had been rifled of their eggs since the previous day. As the well-known enemies of these birds had been banished, I was forced by a process of elimination to the conclusion that the white-footed mouse was responsible for these raids, but, since I had the experience related above, it would seem that the Robin is not above suspicion as a home-breaker.

It would be a difficult matter to prove that egg-eating is a habit of the Robin. Egg-eating birds usually discard the egg shells and swallow only the soft embryos or the semi-liquid yolk and albumen. This material is quickly assimilated; consequently the analysis of stomach contents throws little light on this question. The enormous destruction of bird life due to the egg-eating proclivities of the Crow is known to most field naturalists, yet a recent extensive investigation of the economic status of this species, based on stomach analysis, did not furnish proof of the extent of this habit. In the case under discussion where there was the strongest circumstantial evidence that one of the parent Robins had either eaten the Pewees' eggs or else fed them to the nestlings within a few hours of their being killed careful examination of the stomachs of all five birds revealed no trace of the embryos.

The house-cat is probably responsible for more destruction of insectivorous birds than is any other of the many natural enemies that the sanctuary guardian has to contend with. Domesticated or *ferae naturae*, full fed or hungry, the cat is a bird-hunter by instinct and by choice. In a small bird-sanctuary where the natural wariness of the

bird tenants has been modified through constant human association, the cat finds profitable and easy hunting. We are told that cats can be trained not to attack birds, but my experiences have only served to strengthen my doubts of this assertion and, after my pet cat, who was sleek with good feeding, had clawed her way up the side of an out-house and dragged a sitting Mountain Blue-bird from her nest, I gave up trying to educate puss as a hopeless task and decided that she was a luxury I could not afford. However, their destructive qualities are receiving full measure of publicity in these days of enlightened bird-protection, and it is a healthy sign of progress when two of the major game associations of British Columbia propose that the cat be controlled by a license system.

The House Wren, in this sanctuary, has proved himself an irresponsible and immoral little vagabond. When he first comes in the spring, and, perched on the ledge of my bedroom window, trills a clear bubbling ecstasy of song, it is hard to realize at these moments that many of his ways are evil and that his presence in the sanctuary is taboo. But I know him of old. He will beglamour me with his song and his merry ways in the intervals of stuffing the bird-houses full of twigs until the entrances are blocked. And then, after he has secured a mate and they have selected

a bird-house for their housekeeping, and after I have laboriously cleaned out the cock nests from the other boxes and decided to give him one more chance he will repay my forbearance with his usual malevolence. For he wants every bird house and every hole where a nest can be built for his own private use and the rightful tenants will be harassed and persecuted at every opportunity. His dislike of other box-nesting birds is apparently an active instinct and much of his superfluous energy is spent in squabbling with the peaceful Tree Swallows and Blue-birds. Unless he is forcibly repressed, the little ruffian will sometimes enter their nests and pierce their eggs with his sharp bill, apparently in rage and spite, as he does not eat the eggs. For two successive summers I was absent during the early part of the breeding season, and, on my return, found three pairs of House Wrens in possession and the remaining seven bird-houses stuffed so full of twigs that the entrances were impassable. It was obvious that the Swallows and Blue-birds required the aid of a human ally to withstand the aggressions of the House Wren, and, as seven or eight pairs of the former are thought preferable to three pairs of Wrens and a litter of twigs in empty bird-houses, such assistance has not been withheld since that time.

THE FRESH-WATER LEECHES (HIRUDINEA) OF SOUTHERN CANADA

BY J. PERCY MOORE

(Continued from Vol. XXXVI, page 11.)

Hæmopsis grandis (Verrill).

"Blue Sea Lake, Quebec, September 28, 1919. R. M. Anderson. Clinging to keel of boat." One specimen. The vestigial jaws bear an apical double fold but no trace of teeth.

"On dead pike (*Esox lucius*), Rideau River, Ottawa, Ontario, April 6, 1917. F. Johansen." The single example was dissected. The reproductive organs present some peculiarities. Both atrium and vagina lie to the right of the nerve cord. The epididymis is unusually massive and lies along the entire length of the sperm-sac. The much enlarged vagina reaches to ganglion XVI, the posterior half being greatly inflated and the much crowded and folded anterior half being only one-third to one-eighth its diameter.

"Rideau River, near Ottawa, Ontario, May 15, 1918. P. Blakeley." An immaculate individual with a distinct and continuous marginal yellowish stripe.

"Rideau River, Ottawa, Ontario, October 12,

1919. W. K. Bentley." A very pale specimen, smoke-gray above, ashy-gray below, with a rather distinct yellowish marginal stripe.

"Rideau River, Ottawa, Ontario, middle of May, 1919. E. M. Kindle." One, unspotted.

"Kapuskasing River (Moose River), Ontario, July 8, 1919. C. E. Johnson." A young one 16.5 mm. long. Dorsum smoke-gray thickly speckled with irregular black spots sometimes confluent. Venter light gray, immaculate except near the margins, where there are a few black spots.

"Cross Lake, Manitoba, summer, 1919. F. J. Alcock." One.

"Probably from lakes in Alberta and Saskatchewan, 1894. John Macoun." One, with *H. marmoratis*.

ERPODELLIDÆ.

Erpobdella punctata (Leidy)

"Elmsdale, Nova Scotia, July 2, 1920, May 23-28, 1921. A. H. Leim." A small example dredged in shallow water at each station.

"Amherst, Magdalen Islands, Quebec, middle of July, 1917. F. Johansen." Three small examples.

"McKay Lake, Ottawa, Ontario, September 22, 1918. F. Johansen." One.

"Ottawa River, near Hull, Quebec, October 13, 1918. F. Johansen." One with *D. parva* and *G. complanata*.

"Bight of Ottawa River (Hull Park), Quebec, July 6 and 7, 1919." One small leech and one egg capsule; with *G. heteroclitus*.

"Stream near Chelsea Road, Hull, Quebec, May 9, 1920. F. Johansen." Three specimens medium size and typical coloration.

"Ottawa River, at Interprovincial Bridge, Hull, Quebec, May 30, 1920. F. Johansen." One, with genital pores separated by three annuli.

"Lake at Cochrane, Ontario, June 21, 1920. F. Johansen." One, of medium size.

"Solomon Lake (near Yarmouth), Nova Scotia, October 4, 1920. A. G. Huntsman." One small, very dark example.

"Pond on fields at Moose Factory, Ontario, July 14-15, 1920. F. Johansen." One small specimen, with the black spots limited to the paramedian series.

"A. N. S. No. 1131, Long Point, Ontario, September 24, 1899. Reighard."

"A. N. S. No. 1132, Rondeau Harbor, East Swamp, Ontario, August 28, 1899."

"A.N.S. No. 3400, near Wiarton, Georgian Bay, Ontario, July 12, 1915. A. B. Klugh."

Eryobdella punctata subspecies *annulata* nov.

Form similar to *E. punctata*, but in extension rather more slender and terete; in contraction similarly depressed and with sharp borders posteriorly as in that species. Size medium, the available specimens not exceeding two inches in length. The type has the following measurements. Length 42 mm., to clitellum 6 mm., of clitellum 8 mm. Width just anterior to clitellum 1.7 mm., width at male orifice 3 mm., width midway between clitellum and caudal end 2.2 mm.

Annulation, position of eyes, genital orifices and nephridiopores exactly as in *E. punctata*. Dissections show that the reproductive organs are identical with those of *E. punctata* and sections that the muscular coats are equally thick.

On the dorsum the ground color is olive brown; on the venter abruptly much paler, inclining to yellow and strictly immaculate. Dorsally the lip is dusky and is followed by an area on the posterior part of the head that is paler and without definite markings but with a suffused duskiness. Following this the remainder of the dorsum to the anus is strongly and conspicuously barred with black. Each annulus bears a heavy but

irregular transverse bar lying somewhat nearer to the cephalic border. In most cases this continues across the middle line but there becomes somewhat narrower, giving the effect of a pale median longitudinal stripe. Toward the margins also of some specimens the bars may become incised, in which case they end laterally as deep black spots. The cutaneous sense organs appear as minute pale points on the dark background but they are too small to break up the black bars as in typical *punctata*. Caudal of the anus and on the sucker black pigment is scanty, occurring chiefly as lines on the radiating ridges.

E. annulata has been known to me since 1899 when Professor Trevor Kincaid sent me a small collection of leeches from Lake Washington, near Seattle, which included twenty-two specimens of this form. It was dissected and studied at that time and most of this description written but never published. The type is No. 3885 of the collection of the Academy of Natural Sciences of Philadelphia.

It is clearly a well-marked geographical race or subspecies of *E. punctata* from which it differs in the very dense pigmentation and strikingly cross banded or annulate pattern. None of the upwards of fifty specimens examined equals the largest of *E. punctata* and it may prove that smaller size and more slender form are among its characteristics. No structural differences have been detected and while it is easy to separate fresh, unfaded specimens it is probable that bleached museum specimens of the two forms could not be distinguished.

Geographically, *E. annulata* replaces typical *E. punctata* in the humid Pacific region of Washington, Oregon and British Columbia, and some approach to the type is found along the northern border states.

In this collection, the form is represented from Vancouver. "Ucluelet, Vancouver Island, B.C., June, 1909. W. Spreadborough. Fresh water."

There are twelve specimens, all immature, but with developed clitellum. All are contracted, with somewhat depressed form but margins not very sharp except for the caudal flanges. They vary in size from 18 by 2.8 millimeters to 28 by 4 millimeters, the extreme width in all cases being close to the caudal end. The first pair of eyes usually shows distinctly, but the second and third are obscure. All have the pigment somewhat faded but with few exceptions the annulate pattern is distinct. In some the bars extend the full width of the dorsum, but in most they are sharply divided into halves by a median paler stripe.

Nephelopsis obscura (Verrill).

"Near Beaver Lake, Alberta, summer, 1907. A. Halkett." Two specimens, one 19 mm. long, thickly sprinkled with fine small black spots on a light clay color background; the other about twice the size and shrunken through drying. With *P. rugosa* and *H. marmorata*.

"Jasper Park, Alberta, summer, 1919. W. Spreadborough." Four much spotted specimens.

Miss Ryerson has recorded a large number of this species from Georgian Bay. In a bottle from Pembroke Lake, Cape Breton Island, are several egg cases resembling those of this species.

"Loch Lomond (near St. John), New Brunswick, October 7, 1920. A. G. Huntsman." Two small specimens, one thickly, one sparsely spotted, and two egg-cases.

"Pond on fields at Moose Factory, Ontario, July 14-15, 1920. F. Johansen." Three medium sized, sparsely spotted specimens, and two egg-cases.

"Missinaibi River, Ontario (between Mattice and Opazatika River), June 24, 1920. F. Johansen." Two small specimens, with well-developed clitella. One measures 46 mm. long and is thickly blotched, the other 64 mm. and is marked with scattered blotches on a yellowish ground.

Dina parva (Moore).

"Ottawa River, near Hull, Quebec, October 13, 1918. F. Johansen." Twelve specimens, none exceeding an inch in length. No pigment. Sex pores separated by three and one-half annuli. With *G. complanata* and *E. punctata*.

"Lake Deschenes, Ottawa, Ontario, July 10,

1919, W. K. Bentley." One young specimen 14 mm. long. Eyes distinctly four pairs. Obscurely clouded with pigment dorsally.

"Stream-pool at St. Foye Monument, Quebec City, Quebec, September 19, 1919. F. Johansen." One specimen 15 mm. long, contracted. Nearly uniform grayish, darker above where there appear to be some scattered flecks of pigment. Eyes eight, the first two pairs quite distinct.

"Catfish Bay, Hull, Quebec, May 16, 1920. F. Johansen." One typical example.

"Pool at Catfish Bay, Hull, Quebec, May 16, 1920. F. Johansen." One with the genital orifices separated by only two and one-half annuli.

"A. N. S. No. 3401, Cataraqui River, Kingston, Ontario, October, 1915. A. B. Klugh."

This species has not been reported previously from Canada.

Dina ferrida (Verrill).

"Elmsdale, Nova Scotia, June 14, 1920. A. H. Leim." A small specimen somewhat doubtfully referred to this species.

"A. N. S. Nos. 1137-8, Long Point, Ontario, August 18, 1899."

"A. N. S. No. 1142, Long Point, Ontario, August 21, 1899."

"A. N. S. Nos. 1139-40, Rondeau Harbor, August 28, 1899."

"A. N. S. No. 3402, Cataraqui River, Kingston, Ontario, October, 1915. A. B. Klugh."

Not in the Ottawa collection, nor reported by Miss Ryerson, but abundant in Professor Reighard's Lake Erie collection.

AUTOBIOGRAPHY OF THE LATE PROF. JOHN MACOUN

TO BE PUBLISHED AS A MEMORIAL VOLUME BY THE OTTAWA FIELD-NATURALISTS' CLUB

Members of the Ottawa Field Naturalists' Club will be pleased to learn that the Club has made arrangements to publish the autobiography of the late Prof. John Macoun, Assistant Director and Naturalist to the Geological Survey of Canada. As the volume will be sold by subscription it will be necessary to have a sufficient number of subscribers to pay for its publication before the order is given to the publishers. Hence, those who desire a copy should notify Mr. Arthur Gibson, Dominion Entomologist and Treasurer of the Macoun Memorial Committee, Birks Building, Ottawa, without delay. The price of the volume, which will be one of between 300 and 400 pages, will be \$3.00. Further information will be found in the prospectus which has been sent to each member of the Club.

This autobiography was written by Prof. Macoun while residing at Sidney, Vancouver Island, B.C., and he was still engaged upon it when the illness which resulted in his death on July 18, 1920, brought it to a close; but he succeeded in bringing the history of his life to within a few years of his death.

Those who knew Prof. Macoun will not need to be told that his autobiography will have the personality of the writer of it emphasized in it. Prof. Macoun had a style all his own, two of the characteristics being directness and frankness.

The following brief outline of Prof. Macoun's work and travels will give some idea of what may be expected in this memorial volume.

Soon after his arrival in Canada in 1850 he began the study of botany, and in a few years

was a recognized authority on Canadian plants. He was chosen by Mr. Sanford Fleming to be botanist to the expedition which crossed Western Canada to the Pacific Coast in 1872, searching for a route for the Canadian Pacific Railway. The party was divided at Edmonton, and Mr. Macoun proceeded north-west to the Peace River, then across the mountains to the coast. The account of this expedition with its far reaching results was published in *Ocean to Ocean* by the late Principal Grant.

In 1875 he crossed the mountains again from the west, eventually reaching the Peace River, and from Fort St. John, with one companion, paddled down the Peace for 700 miles in a dugout canoe, and after great hardships continued east via the Athabasca River and various lakes and smaller rivers, then across country to Winnipeg, and on to Ontario. He travelled on this trip alone about 8,000 miles. His report on the country traversed was published in the Railway Report for 1877, and created much interest throughout Canada and was notably influential in the settlement of the North-West.

In 1879, he made a further extensive exploration of the prairies, and his glowing reports on the value of the North-West for wheat raising and his numerous lectures on this subject did much to awaken an interest in the west and to set emigration in that direction. He also corrected many erroneous opinions in regard to the climate and soil of the prairies. He continued his explorations on the prairies in 1880, 1881 and later, and in his book "Manitoba and the Great North-West," published in 1881, he brought together a vast amount of information in regard to the country.

In every succeeding year down to 1911 he was exploring and collecting in some part of Canada, and his knowledge of the Dominion became very great.

On his appointment to the Geological Survey, in 1882, he severed his connection with Albert College and moved to Ottawa; from that time until his death he was continuously in the service of the Dominion Government. In 1887, he was appointed Assistant Director and Naturalist to the Geological Survey, which position he held until his death. Prof. Macoun was an all round naturalist and became a first authority on Canadian plant and animal life.

His explorations and expeditions were filled with incidents and episodes of a varied nature. Some of his reminiscences were of hardships, some of mishaps and some of a very amusing nature, and their narration in his autobiography affords extremely interesting reading.

Professor Macoun, because of the time of his principal exploration on the prairies, was in close touch with the men who had most to do with deciding on the route of the Canadian Pacific Railway, and his comments on the different routes proposed and the men connected with the enterprise both from the standpoint of the Government and the Railway are very interesting.

He was a very wide reader, and was well posted on the principal events taking place in the world, but he was particularly interested in the political life of Canada, though taking little active part in politics. Incidentally his views on many public questions of the day are to be found in this volume.

MR. ARTHUR GIBSON, Dominion Entomologist (Treasurer).

DR. FRANK T. SHUTT, Assistant Director of Experimental Farms and Dominion Chemist.

MR. WILLIAM T. MACOUN, Dominion Horticulturist.

The John Macoun Memorial Committee of the Ottawa Field-Naturalists' Club, Ottawa, Canada.

BOOK REVIEW

NANTUCKET WILD FLOWERS, by Alice O. Albertson, Curator of the Nantucket Maria Mitchell Association; illustrated by Anne Hinchman; G. P. Putnam's Sons, New York and London.

This is a volume of 442 pages of a size to fit the pocket. It was prepared specially for those who desire a more intimate knowledge of the wild flowers of Nantucket. The island of Nantucket, thirty miles at sea, is a happy hunting ground for botanists. The book has been written to describe with all possible accuracy and few technicalities the representative trees and flowers. It will be found of course of particular interest to residents of Nantucket, but students of distribution will also

find it of value. Keys at the beginning of the book will assist in the identification of unknown specimens. The volume is well illustrated, showing character of leaves, etc. Coloured plates are interspersed throughout the volume. Altogether the book is an interesting one and should be much appreciated by those who have an opportunity of studying the flora of the locality for which it is specially intended.

A. G.



The Canadian Field-Naturalist

VOL. XXXVI

OTTAWA, ONT., MARCH, 1922.

No. 3

MANITOBA GRASSHOPPERS

BY NORMAN CRIDDLE, DOMINION ENTOMOLOGICAL LABORATORY, TREESBANK, MANITOBA.

Grasshoppers are members of the Order Orthoptera, and, in this article, are recognized as comprising that portion of it known as the Saltatoria. They are separated from all other members of the order by the specialized hind legs which are much larger than the other four and enable the insects to hop as well as walk in the ordinary way. They are the true grasshoppers as separated from the Earwigs, Cockroaches, Mantids and Walking-stick insects, all of which have legs that are of approximately the same size.

The grasshoppers, as above defined, may be divided into the following four families: Tettigoniidæ or Long-horned Grasshoppers; Gryllidæ or Crickets; Acrididæ or Short-horned Grasshoppers and Acrydiidæ called Grouse or Pygmy Locusts. The following brief key will separate these families in our territory:

- 1. Pronotum not greatly extending backwards.
 - A. Antennæ long, usually much exceeding the body in length.
 - b. Tarsi four-jointed . . . Tettigoniidæ.
 - bb. Tarsi mostly three-jointed, middle ones always so. . . Gryllidæ.
 - AA. Antennæ not exceeding length of body. . . Acrididæ.
- 2. Pronotum extending well back over the abdomen. . . Acrydiidæ.

The Tettigoniidæ are distinguished from nearly all other families of Orthoptera by their very long feelers, in which character crickets alone resemble them. From the crickets they may be separated by the four-jointed tarsi and in having, in the females, a flat knife-like ovipositor instead of a round spear-shaped one. There are other characters of separation, but those mentioned are sufficient for the present occasion. The family includes the Katydid, Coneheads and Camel Crickets, the first two being usually green and the last dull in color, without wings.

It is to the Katydid and Coneheads that we owe most for the insect music of late summer. They have, however, close competitors in the crickets.

The Gryllidæ include the cricket made famous by Dickens, the species he refers to having been introduced into this country some years ago. In addition we have a number of native species, all darker in color but fully equal to the domestic cricket in musical abilities.

The Gryllidæ are divided into a number of sub-families, the most important of which, in our territory, are the Gryllinae and Ecanthinae (Ground Crickets and Tree Crickets). These may be differentiated in the following manner:

- Head short, vertical, ocelli present, color black or brown.—Gryllinae.
- Head elongate, horizontal, ocelli absent, color green or whitish.—Ecanthinae.

Our species of the sub-family Gryllinae are all ground-loving insects which delight to hide under any convenient object, as well as in grain stooks, hay cocks or stacks. When none of these are convenient they dig small burrows in which they live. We have two genera in Manitoba, one embracing the common large crickets and the other known as *Nemobius* containing very similar insects of less than half the other's size. The large ones contain two sub-species, namely: *Gryllus luctuosus*, the Fall Cricket, and *G. pennsylvanicus*, the Spring Cricket.

The last named winters as a nymph and is fully developed by the end of May. The other appears in July, developing from over-wintering eggs.

Apparently we have but one species of *Nemobius*; it is extremely common, being found nearly everywhere on both high and low land. Ground crickets lay their eggs in the soil like grasshoppers proper, but they do not place them in a sac. The eggs are narrow, cylindrical objects and shiny whitish in color. We found them in great abundance during the fall of 1921 wherever the land was at all sandy; the adults had been very numerous previously and caused no little apprehension in some parts.

The Ecanthinae or Tree Crickets are quite unlike the Ground Crickets, all being greenish in

color, slender in build and frequenters of vegetation such as flowers and shrubs rather than of the ground. We have but one species in Manitoba, the Raspberry-cane Tree Cricket (*Oecanthus nigricornis*), so called from the damage it does to cultivated raspberry canes while egg laying. In reality, nearly any kind of hard-stemmed plant is utilized for laying eggs in, the eggs being placed in small slits made in the bark by means of the insect's ovipositor. The practice of ovipositing in the bark of trees, etc., seems to be to protect the eggs only, as the young feed upon leaves. Nevertheless, the habit is very detrimental and often results in serious damage being done to the stems of small fruit shrubs. In Manitoba the wild rose is one of the most frequently used plants.

ACRIDIDAE

The Acrididae or true locusts are the most conspicuous of our grasshopper fauna and among them are those that are recognized the world over as pests of growing crops. One species, doubtless belonging to the genus *Acridium*, probably constituted the sixth plague of Egypt. Africa, Asia and South America all have their plagues, which, at times, come in such numbers as to darken the sky, and, with voracious appetites, clean up every vestige of vegetation in the districts visited. We have our destructive kinds here which at times attain very large proportions. In 1819 they cleaned up the crops of some of our first settlers in the Lord Selkirk Settlement; in 1871-75 the whole country seemed to be infested with them, and the old settlers can still recall the flights that fell like snow from a clear sky, dropping like a scourge upon the land beneath. They can remember, too, the heaps of dead and dying even over the land that is in the heart of Winnipeg today. These were the Rocky Mountain Locusts which came from climes adjacent to the Rocky Mountains, their original breeding-ground. Dryness and favorable winds multiplied and brought them to our country, but eventually our climate proved unsuitable and they either died or flew elsewhere.

There was a smaller outbreak of the Rocky Mountain Locust in 1890 and yet another from 1900 to 1903, but that was the last and they have not been seen in our territory since. The insect is very rare now and some authorities think it has become extinct, but this hardly seems probable. Possibly, in the future, we may have other invasions, but if we do we shall be prepared and will know how to deal with them.

While the old Rocky Mountain Locust has vanished from our province, we have others that are natives which, at times, develop into important

pests. There has been an instance of this during the last three years, when considerable damage was done to crops, but the loss is not as it would have been in the past. Efficient remedies have been devised since then which enable us to cope with the insects successfully. Probably few people recognize how much has been done in the way of grasshopper fighting during these last three years, nor might they credit the fact that poisoned bait has, in some instances, accounted for a death rate of more than 200 bushels of grasshoppers to the acre.

The Acrididae are usually separated into three sub-families: the Acridinae (*Tryxalinae*), *Ædipodinae* and *Locustinae*. There is no very strict line of demarcation between these, so I will not go into details. The Acridinae are all clear-winged grasshoppers with a rather slanting face. They seldom occur in injurious numbers.

The *Ædipodinae*, on the other hand, nearly always have some coloring in their wings such as yellow, red or black, while frequently the hind wings are gorgeously colored so that the insects may be mistaken for a butterfly when on the wing. In addition, the face is almost vertical instead of slanting backwards. The sub-family contains some of our largest locusts, such as members of the genus *Xanthippus* and the well known Carolina Grasshopper, which has black inner wings bordered with yellow. Many of the species, too, are very noisy, giving forth a loud crackling sound as they fly.

Not many of the *Ædipodinae* are of marked economic importance but they are all grass feeders and, therefore, have only to become sufficiently numerous to turn into pests. One of them has already done so on our prairies, namely the Roadside Grasshopper (*Camnula*). This is one of the few pale-winged forms, though most specimens show a distinct yellowish tinge. The species derives its name from its habit of depositing its eggs in the sod-land along roadways, though it also lays freely in other sodded areas. It differs from other injurious species in depositing its eggs amid clumps of grass instead of in small bare spots. The fact that the Roadside Grasshopper is somewhat particular as to where it lays its eggs often results in the insects bunching up on suitable sod until such places are literally crowded with eggs. So thick do they become that we have counted more than 3,000 to a square foot of sod.

The *Locustinae* are told from the other sub-families by the presence of a spine-like wart on the prosternum between the front pair of legs. All our species have clear whitish wings. It is to this sub-family that the Rocky Mountain, the

Red-legged, Lesser-migratory and Two-striped Locusts belong, as well as most of the injurious species of other countries. Among them are to be found most of the kinds that migrate long distances, often in large swarms. It is a remarkable sight to see them on a sunny, moderately windy day suddenly rise in circles, up, up until they feel the wind sufficiently strong to bear them away, when away they go facing the wind, but carried away by its strength.

ACRYDIDAE

Grouse Locusts are among the smallest winged grasshoppers known in this country and their size, combined with their inconspicuous coloration, makes them less known than any other family. We have at least four species in Manitoba, all of which are to be met with in low-lying situations or in semi-open woods. They are somewhat diversified in habits, some kinds wintering as adults, others as nymphs of eggs.

Grouse Locusts, like the Acrididae, deposit their eggs in sacs or pods which are placed in the ground. The female when she is ready for egg laying works the top of her abdomen into the ground by the aid of the horn-like valves which open and shut as she forces her body downwards. Eventually getting deep enough, she begins to lay her elongate eggs one at a time, forming a glutenous substance around them as she proceeds. When about 14 eggs have been deposited the grasshopper carefully covers the opening by kicking and drawing small particles of soil over it, then, having hidden all traces of her work, she hops actively away.

The food of Grouse Locusts consists of various lichens and other vegetable matter found near the ground. So far as we know this family is of no particular economic importance.

I have already dealt in part with the life histories while reviewing the different sub-families, but it may be interesting to give a more detailed account of one of the commoner species of Locustinae.

The time at which the small hoppers emerge from the eggs varies in the different kinds; some appear in the fall and winter in the nymph stage; others winter as eggs and do not emerge until the warmth of approaching summer insures abundance of succulent vegetation. All our injurious kinds have this last habit and their emergence would almost seem as if it were timed to coincide with the appearance of the farmers' grain crops. As I said before, the eggs are laid in the soil and the situation selected for them is chosen with great care. Indeed, I have known a female grasshopper seek for more than an hour before she became satisfied with the situation and commenced to

work her abdomen into the ground.

When the tiny hopper is ready to emerge it breaks through the egg and begins to work its way upwards by wriggling. If the egg be covered a couple of inches or more by soil, the struggle to emerge, is quite a long one, but it is really remarkable how much the insects can get through by steady shoving. So, eventually, the hopper finds itself upon the surface, a colorless object, seemingly so exhausted that it lies on its side and, metaphorically speaking, gasps for breath. Just when one wonders whether it is going to recover at all, there is a movement of returning animation, the skin splits behind the head and soon the hopper is seen casting its skin as one might expect a small boy to get out of a very tightly-fitting suit. The skin is gradually pushed downwards as the hopper wriggles out until at last only the hind legs remain encased. Another effort and one leg is free; the rest is child's play. The hopper now rests, again rather exhausted, but a change soon begins to take place. The new skin, which was pinkish or whitish at first, slowly colors to the shade characteristic of the species, gray, black or green, as the case may be. The work, however, that the hopper has gone through has been tiring, and so the insect seeks a sheltered spot where it can sun itself and rest. It goes to bed at night beneath some convenient herbage and does not think of food until the second day. First there is a mere nibble of some succulent grass blade, but food and sunlight soon create a greater appetite for more food, growth being a natural outcome. In the course of about eight days our hopper has grown too large for its coat, so it sets to work to grow a new one beneath the old one. As soon as this is ready the insect crawls up a convenient stem and obtaining a firm foothold with all its legs, with the head downwards, slowly commences the operation of skin casting. Careful watch will reveal violent contortions and muscular protuberances along the pronotum. Soon the antennae sink below the eyes and the skin splits along the back. From this point the old skin is slowly left behind as the hopper wriggles out of it. Eventually, just as one expects the hanging hopper to drop, it makes a violent swinging motion and clutches hold of the stem its old skin is attached to and at the same time draws itself free. The hopper now turns head upwards and remains inactive until the new skin hardens and assumes the coloring characteristic of the species. The resting period, after moulting, lasts a considerable time, it being fully three hours before the insect is ready to commence feeding again. In the course of some six weeks, the hopper has cast its skin

five times, not including the hatching month. At the third moult, the wing pads become distinctly visible and with the succeeding change assume larger proportions, until, at the final moult, the insect is adorned with the wings that proclaim it fully developed. Growth is now at an end and new activities are entered into.

Flight comes first, as the now fully developed grasshopper has an instinctive desire to see the world. But there are other considerations also. The attainment of wings has provided at the same time a musical instrument for the male with which he charms his lady-love into admiration for his accomplishments.

The instinct of migration is one of the most remarkable in the animal kingdom. It seems to arise from a desire in each species to spread as far as possible over the land. It has very little to do with food supply in grasshoppers, but appears to be more an effort to prevent overcrowding, and thus escape disease and enemies of other kinds. The provision in some species is wonderful in its completeness. There are long-winged, medium-winged and short-winged ones. Think of the result; the strong-winged ones move for a field, the medium-winged to comparatively nearby places, while those with short wings remain to carry on the race close at hand.

The main period of flight begins soon after the grasshoppers obtain wings, but flying continues intermittently for more than a month. The flights always commence in bright sunshine and

end as soon as the sun becomes overcast or when the shades of evening show that the day is drawing to a close.

The music of grasshoppers is usually produced by rubbing the hind legs bow-like against a specially developed object upon the wings, but in some cases the wings themselves are rubbed together. Each kind of grasshopper that can play at all has its own particular music which can be told without much difficulty from that of others. You know how crickets chirp. The Green Tree Cricket has a steady trill which is noted most in August, hence the name Harvester which is sometimes applied to this insect. The Katydid gets its name from the song it sings, "*kat-y-did*." It is not a Manitoba insect but we have some close allies which cry "*she-sees-me*" with great persistency although it is pitch dark. For the Katydids are night singers and avoid the sun as much as the locusts seek it. The crickets are also night singers unless they find some darkened place beneath some object, in which case they sing all day as well. This music, which begins with the warmth of spring, ceases as the nights grow long and cold in autumn. There are a few kinds of Orthoptera that play on into late October, but the majority are then silent, and, as winter draws near, the music of the insect world grows mute and the lives that were so animate are cold in death.

(To be continued.)

THE SUMMER BIRDS OF ADVOCATE, CUMBERLAND COUNTY, NOVA SCOTIA

BY CHARLES W. TOWNSEND, M.D.

Nearly midway between Cape Chignecto and Cape d'Or, and washed by the tides of the Bay of Fundy as they rush in and out of the Basin of Minas, lies the little village of Advocate. Pleasantly introduced by Dr. John W. Dewis of Boston, a native of this place and a fellow ornithologist, my wife and I spent here the last few days of June and the first three weeks of July, 1921, in searching out the birds. Our steps led us to Cape d'Or on the east and Refugee Cove near Cape Chignecto on the west. We also spent five days at Isle Haute, which was discovered by Champlain in 1604 and accurately described in his "Narrative." He says: "Heading northeast nine or ten leagues, coasting from Port Royal (Annapolis), we crossed a part of the Bay some five or six leagues in breadth to a place which we named the Cape of Two Bays (Cape Chignecto), and we passed by an island (Isle Haute) which is a league from it

and which is about that distance in circumference, and is some forty or fifty fathoms in elevation. It is entirely surrounded by great rocks excepting in one place where there is a slope, at the foot of which is a pond of salt water, which lies at the base of a gravel point having the form of a spur. The top of the island is flat, covered with trees, and it has a very good spring."

Champlain also described and charted Advocate Harbor, which he called Port des Mines from the copper mines at Cape d'Or. To his attributes of explorer, cartographer and historian, that of bird-lover may be added, as the following extract from his "Narrative" shows. Speaking of his garden at Port Royal he says: "We often went there to pass the time, and it seemed as if the little birds around took pleasure in it, for they gathered there in such numbers, singing and warbling so charmingly that I do not think I

ever heard anything like it."

There are cultivated fields and dyked meadows at Advocate, but behind and on both sides back from the sea, the country is heavily forested, for the most part with red spruce and balsam fir, white and yellow birches. White spruces are common near the sea. The black spruce and sweet birch are rare and the gray birch, larch and mountain ash are not uncommon. Sugar maples and ashes are also found. The region is more boreal than the Annapolis valley through which we passed, where red oaks, white and red pines, hemlock and beeches are common. Birds of the Transition Zone seen in the latter region and not encountered in Advocate were: Wood Peewee, Least Flycatcher, Chestnut-sided Warbler, Catbird, Veery and Bluebird.

In the following list of eighty-one species, all, with the exception of the Loon, Double-crested Cormorant, Great Blue Heron and Least Sandpiper, were breeding in this region, and it is possible that these may breed there. In the previous summer I found evidence of the Least Sandpiper breeding farther south at Cape Sable Island.

- 1 LOON: *Gavia immer*. Few.
- 2 BLACK GUILLEMOT: *Cephus grylle*. Eight or ten pairs breeding in the cliffs of Isle Haute.
- 3 GREAT BLACK-BACKED GULL: *Larus marinus*. Although I did not find their nests, I believe that several pairs bred at Isle Haute.
- 4 HERRING GULL: *Larus argentatus*. About five hundred pairs, possibly more, nested on the cliffs of Isle Haute and especially on the steep turf-clad portion of the western side. Here the nests were, for the most part, in depressions of the turf and destitute of nesting material. On July 12 most of the young were out of the eggs and running widely on the turf, but confined within narrow limits on the ledges of the cliffs.
5. DOUBLE-CRESTED CORMORANT: *Phalacrocorax a. auritus*). Two or three seen.
6. RED-BREASTED MERGANSER: *Mergus serrator*. A pair nesting near the salt pond at Isle Haute.
7. EIDER: *Somateria mollissima dresseri*. Six or seven pairs nesting at Isle Haute. On July 14 a pair seen, the male in full nuptial plumage. On July 16 a nest with four eggs was shown me by the light-house keeper under a spruce bush on the cliff about fifty feet up. On the same day a flock of fourteen were seen, all in brown dress but two, that were only partially moulted into the eclipse plumage.
8. GREAT BLUE HERON: *Ardea herodias*. One seen.
9. LEAST SANDPIPER: *Pisobia minutilla*. A few migrating flocks.

10. SPOTTED SANDPIPER: *Actitis macularius*. Common.

11. SEMIPALMATED PLOVER: *Aegialitis semipalmata*. On July 1, two pairs plainly showed by their actions that they had eggs or young on the sandy and pebbly bay of Advocate Harbor. *Vide Auk*, xxxviii, 1921, p. 601.

12. CANADA RUFFED GROUSE: *Bonasa umbellus togata*. Common.

13. BROAD-WINGED HAWK: *Buteo platypterus*. One seen on June 28.

14. OSPREY: *Pandion haliaetus carolinensis*. Two seen.

15. GREAT HORNED OWL: *Bubo v. virginianus*. On June 29, three young, fully grown and able to fly, but with heads still in the down and with downy ear tufts were seen in spruce woods. One called repeatedly a plaintive note—*ee-ah*.

16. BELTED KINGFISHER: *Ceryle alcyon*. Few seen.

17. HAIRY WOODPECKER: *Dryobates v. villosus*. Few seen.

18. DOWNY WOODPECKER: *D. pubescens medianus*. Few seen.

19. ARCTIC THREE-TOED WOODPECKER: *Picoides arcticus*. One seen on July 1.

20. NORTHERN FLICKER: *Colaptes auratus luteus*. Common.

21. CHIMNEY SWIFT: *Chaetura pelagica*. A few. A pair was found nesting in a fish house at Refugee Cove. The nest was attached to a piece of canvas nailed to the logs of the wall near the roof, and the birds entered through a stove pipe hole in the roof. There were five eggs on July 9.

22. RUBY-THROATED HUMMINGBIRD: *Archilochus colubris*. A few.

23. KINGBIRD: *Tyrannus tyrannus*. Uncommon.

24. OLIVE-SIDED FLYCATCHER: *Nuttallornis borealis*. Not uncommon.

25. YELLOW-BELLIED FLYCATCHER: *Empidonax flaviventris*. Common. On July 5, I found a nest between two moss-covered logs on the ground containing several black, downy young.

26. ALDER FLYCATCHER: *E. traillii alnorum*. Uncommon.

27. CANADA JAY: *Perisoreus c. canadensis*. One seen.

28. NORTHERN RAVEN: *Corvus corax principalis*. Common. A family group of four or five at Refugee Cove and another at Isle Haute. At the latter place they undoubtedly preyed on the eggs and young of the Herring Gull.

29. CROW: *Corvus b. brachyrhynchos*. Common.

30. BOBOLINK: *Dolichonyx oryzivorus*. Few.

31. RUSTY BLACKBIRD: *Euphagus carolinus*. Few.
32. BRONZED GRACKLE: *Quiscalus quiscula aeneus*. Few.
33. PURPLE FINCH: *Carpodacus p. purpureus*. Abundant.
34. RED CROSSBILL: *Loxia curvirostra minor*. Few.
35. WHITE-WINGED CROSSBILL: *L. leucoptera*. Common.
36. GOLDFINCH: *Astragalinus t. tristis*. Common.
37. PINE SISKIN: *Spinus pinus*. Common.
38. VESPER SPARROW: *Poocetes g. gramineus*. Few.
39. SAVANNAH SPARROW: *Passerculus sandwichensis savanna*. Abundant.
40. ACADIAN SHARP-TAILED SPARROW: *Passerherbulus nelsoni subvirgatus*. Common.
41. WHITE-THROATED SPARROW: *Zonotrichia albicollis*. Abundant.
42. CHIPPING SPARROW: *Spizella p. passerina*. Common.
43. SLATE-COLORED JUNCO: *Junco h. hyemalis*. Abundant.
44. SONG SPARROW: *Melospiza m. melodia*. Abundant.
45. LINCOLN'S SPARROW: *M. l. lincolni*. One seen on July 6.
46. SWAMP SPARROW: *M. georgiana*. Few.
47. ENGLISH SPARROW: *Passer domesticus*. All too abundant in the village.
48. CLIFF SWALLOW: *Petrochelidon l. lunifrons*. Abundant.
49. BARN SWALLOW: *Hirundo erythrogaster*. Common.
50. TREE SWALLOW: *Iridoprocne bicolor*. A few.
51. BANK SWALLOW: *Riparia riparia*. A few.
52. CEDAR WAXWING: *Bombacilla cedrorum*. Common.
53. RED-EYED VIREO: *Vireosylva olivacea*. Common.
54. BLUE-HEADED VIREO: *Lanivireo s. solitarius*. Common.
55. BLACK AND WHITE WARBLER: *Mniotilta varia*. Few.
56. NASHVILLE WARBLER: *Vermivora r. rubicapilla*. Common.
57. TENNESSEE WARBLER: *V. peregrina*. Common.
58. NORTHERN PARULA WARBLER: *Compsothlypis americana usneae*. Common.
59. YELLOW WARBLER: *Dendroica a. aestiva*. Common.
60. BLACK-THROATED BLUE WARBLER: *D. c. coerulescens*. Few.
61. MYRTLE WARBLER: *D. coronata*. Abundant.
62. MAGNOLIA WARBLER: *D. magnolia*. Abundant.
63. BAY-BREASTED WARBLER: *D. castanea*. Few.
64. BLACKBURNIAN WARBLER: *D. fusca*. Few.
65. BLACK-THROATED GREEN WARBLER: *D. virens*. Abundant. One at Isle Haute sang twice a part of the song of the Tennessee Warbler.
66. YELLOW-PALM WARBLER: *D. palmarum hypochrysea*. Few.
67. OVEN-BIRD: *Seiurus aurocapillus*. Few.
68. WATER-THRUSH: *S. n. niveboracensis*. Few.
69. MOURNING WARBLER: *Opornis philadelphia*. One pair found.
70. MARYLAND YELLOW-THROAT: *Geothlypis t. trichas*. Abundant.
71. CANADA WARBLER: *Wilsonia canadensis*. Few.
72. REDSTART: *Setophaga ruticila*. Abundant.
73. WINTER WREN: *Nannus h. hiemalis*. Common.
74. BROWN CREEPER: *Certhia familiaris americana*. Few.
75. RED-BREASTED NUTHATCH: *Sitta canadensis*. Few.
76. CHICKADEE: *Penthestes a. atricapillus*. Common.
77. ACADIAN CHICKADEE: *P. h. hudsonicus*. Common.
78. GOLDEN-CROWNED KINGLET: *Regulus satrapa*. Few.
79. OLIVE-BACKED THRUSH: *Hylocichla ustulata swainsoni*. Common.
80. HERMIT THRUSH: *H. guttata pallasi*. Common.
81. ROBIN: *Planesticus migratorius*. Common.

In this brief visit a number of breeding birds were, of course, overlooked. For example, one would expect to find the Black Duck, Bittern, Canada Spruce Partridge, Marsh Hawk, Sharpshinned Hawk, Barred Owl, Yellow-bellied Sapsucker, Nighthawk, Blue Jay, Philadelphia Vireo, Cape May Warbler, Wilson's Warbler and Ruby-crowned Kinglet.

THE RELATION OF WILD LIFE TO AGRICULTURE

BY NORMAN CRIDDLE, TREESBANK, MANITOBA

In the old days, before the arrival of the settler, when the country was one vast stretch of uncultivated land, the wild creatures roamed the plains and woods almost at will. They multiplied or decreased according to the prevailing conditions, such as were brought about by the prevalence of food and the presence or absence of natural enemies. Nature had provided that there should be a balance in all things and, therefore, while certain insects or mammals might increase unduly for a time, they were always eventually reduced by other forms which preyed upon them, or by the meteorological conditions that prevailed. Thus the gophers and mice were kept in check by hawks, owls, weasels and other predatory animals; while the insects were controlled by various parasites in conjunction with a host of birds which found in them a palatable diet. There were no violent changes then, such as is brought about by cultivation, and so the balance which nature had decreed was maintained as it is in all parts where civilized man has not set his foot.

With the advent of civilization, followed by cultivation, conditions became changed. Animals that had previously roamed the wilds in freedom were unmercifully slaughtered with such a lack of discrimination that the useful frequently suffered even more than the harmful. Hawks and owls were among the first to feel this persecution. A few injurious kinds set the farmer against them all, and, as the useful species were much more numerous than the harmful the effects were soon very striking. Rodents had previously subsisted upon wild plants and had found it difficult, at times, to find sufficient for their wants, but the introduction of farming provided an unlooked-for supply. Immediately vast stores of grain were made available and, consequently, as the food supply was now ample and the natural enemies had been killed off, rodents increased at a rate hitherto impossible, with very disastrous results to the farmer.

But this was by no means all. In addition to the rodents, there was a vast army of native insects, a number of which fed upon wild plants. These had fluctuated from time to time according to the available food supply, but the new conditions again upset the balance and, farming having provided abundance of food, the insects began to turn their attention to the new supply and soon became pests of importance. Such are the grass-

hoppers, Wheat-stem Sawfly and cutworms of today, while others, at present less known, threaten to add to the pests which cultivation has thrust upon us.

One more important factor must be added to those enumerated above. Among the greatest friends of man are a host of small birds many of which nest upon the ground. These, in times past, fed upon insects and wild seeds, and they were especially important in keeping the former in check. In this case cultivation again changed conditions in favour of man's enemies. The insects were able to breed as readily, or even more so, in cultivated ground, as on the original sod; but this was not so with birds which, with every acre of land broken up, were obliged to seek new breeding grounds. Thus, as man adds to his cultivated acreage he encourages the insect pests by providing more food and additional breeding places, while, at the same time, he forces his bird friends to seek nesting quarters elsewhere.

Pasturing the land has also done much to destroy bird life, especially around the margins of ponds and lakes. At the same time cropping the grass has encouraged grasshoppers. Indiscriminate setting of fires has done more still, and the burning of woodlands has caused a havoc almost unthinkable. Such is a summary of the changes which have led to our present trouble with insect and rodent pests. Man has provided for them, and man alone can reduce or keep them in check.

We have hitherto dealt only with native animals but in addition to those are a number which have been introduced from other countries. Some of these, like the House Sparrow, were brought in purposely, others have availed themselves of the channels of commerce. It frequently happens that the imported pests are even more dangerous than the native ones, because the latter have always been with us and their enemies are consequently at hand; but this is not so with introduced species which have more often left their foes behind. The new pests are, therefore, generally unhampered by enemies and consequently spread with great rapidity. Several of our worst pests are examples of this. The Hessian Fly is one, the Cabbage-worm of our gardens another. The House Mouse and Brown Rat have both been introduced, though in the case of these we have both owls and weasels to aid us in keeping them in check.

The problem of keeping out foreign pests is one that has received much attention of recent years, but its importance can hardly be over-estimated. This is especially true of insects, though the folly of indiscriminately introducing birds or mammals has also been amply demonstrated and every care should be taken to avoid a repetition of it.

A moment's thought will show that the old conditions have passed away never to return. Civilization has spread over the land almost like a pestilence, and, as it has become established in the new country, it has swept from the face of it many of the creatures that formerly dwelt there. The buffalo had to go, just as it would seem must the elk from our cultivated areas. Others may have to follow such as the wolf and coyote, but we should proceed very slowly even with the destruction of predatory animals until we can definitely ascertain what their place is in the scheme of nature. It may be difficult to exterminate but to replace is impossible. The extermination of any creature from the world in which it has won a place is a responsibility which we should consider very seriously. We should remember too, that conditions change and as they do so they alter the economic status of many things, animals included.

Much irreparable harm has already been done by thoughtless or selfish slaughter of native animals. The Passenger Pigeon has apparently gone for ever. Ruthlessly destroyed to a point where it could no longer withstand the natural enemies with which it had to contend, it has thus vanished from our fauna and left us so much poorer. Others are in danger of a similar fate. The Whooping Crane is on the point of extinction now, the Snowy Owl has dwindled to a mere remnant of its former numbers, in this case due to a mania for collecting, as a casual examination of our country hotels will show.

Before we finally decide on the destruction of any species we should remember that even predatory animals of the worst type have their uses and that they are at times actually of value in destroying some of our useful species. Among all creatures are a certain percentage which fall sick; such animals are naturally weaker than their healthy companions and for this reason they are more apt to fall prey to the carnivorous creatures on the lookout for food. The sickly grouse, flying more slowly, is caught by the Goshawk; an unhealthy deer is more readily overtaken by wolves. But in destroying these the predators are performing a useful act in as much as they are eliminating the unfit and preventing the spread of disease. Were there no animals to carry on this work, it is possible that

disease would become more prevalent, and for this reason we might actually defeat the ends we had in view by exterminating predatory animals.

As we have already pointed out, the restriction of breeding areas by cultivation and grazing is a serious matter, as by it our friends the birds are often banished while our insect and rodent enemies are encouraged. These conditions are, unfortunately, apt to become worse with ground-loving birds, but with others it need not be so; and with tree-loving species, at least, there is no reason why the old balance should not be restored. To accomplish this every farmer should establish a tree belt, preferably near the farm buildings. To make the belt attractive to birds, large trees should border small ones. Deciduous trees as well as evergreens should be planted, also all the available berry-bearing shrubs whose fruit form a staple diet for many birds after the nesting season is over, or when insects become scarce. A few small boxes erected on trees or posts will form attractive nesting places for Wrens, Tree Swallows, Flickers and Blue Birds. Finally, a water trough is important for the birds to drink at and bath in. Such a plantation, with the additions mentioned, would increase the range of many of our birds and their numbers would be multiplied a hundredfold. There would be found the Catbird singing softly in the early morn, the Robin and Oriole in their attractive plumage, the Kingbird, Yellow Warbler, House Wren and many others all adding to the beauties of the landscape and the pleasures of the home. But, apart from the aesthetic side, they would prove of incalculable value as destroyers of noxious insects, thus assisting to restore the balance which man upset in the first place.

Another important factor in restoring bird life should be provided; not, however, by the individual but by the state. This consists of setting aside areas for wild life sanctuary, where the creatures within them can multiply unhindered and as they do so spread over the surrounding country to gather in the pests now so prevalent. Much has already been done along this line, but too much can hardly be accomplished. Every district should have its sanctuary as a permanent breeding centre and the farmers must understand that such areas are almost as important for their welfare as is the maintenance of their flocks. Sport must become secondary to agricultural interests and the depletion of our country of game birds, particularly grouse, should be made impossible. There should also be a greater consideration for predatory animals. The original food of coyotes, for instance, was made up largely of rabbits, gophers and mice, all of which do much

harm, the first named to our trees and the last two to our grain crops and fruit trees. Weasels formerly subsisted to a large extent upon rodents such as gophers, voles, pocket gophers, rabbits, mice and an occasional bird. Their food to-day is practically as it used to be. The number of poultry taken by these animals is a mere nothing in comparison to the noxious rodents killed; and as only one kind of weasel is known to attack poultry out of the three species found in the middle west, these animals can be justly classed as the most beneficial of all mammals found within the country. I am convinced that agricultural interests should take precedence over the fur interests in this question and that the wholesale trapping of weasels should be discouraged as not in the best interests of the community. At present weasels are not in any way protected by law in Manitoba, though mink and beavers, both much less worthy, are provided with a close season, an anomaly that can only be explained by ignorance of the comparative usefulness of the animals involved.

The persecution to which most of our predatory animals and birds have been subjected originates from the fact that there are occasions when most of them will take a barnyard fowl. Naturally, the robber is, as a rule, observed, and, as its every-day habits are not, the conclusions drawn are usually very erroneous. Besides this, truly injurious species are frequently confused with useful ones, such as, for instance, a Goshawk with Swainson's Hawk. In this example, the former being known to take chickens, the latter is suspected of doing likewise and is shot without further consideration. Here then we have need of education which might well be carried on in the schools, but in the meantime we should adapt the principle of justice whereby an animal is considered innocent until it is proved guilty.

The farmer is rapidly learning to appreciate the value of wild birds. The large flocks of Franklin's Gulls which were to be met with

almost daily following the plough during 1920-21 when they gathered up such enormous numbers of grasshoppers, will long be remembered. The birds have already been spoken of as the "Farmer's Gulls," and what fitter species could be chosen as an emblem? White represents purity, its flight symbolizes gracefulness combined with strength, while its persistency in gathering up noxious insects surely indicates the acme of industry and usefulness. Birds so beneficial as these should be afforded every protection, and, above all, they should be provided with permanent breeding places from which they will continue to wander far afield in search of food. Every available lake should be made a gull sanctuary, and steps should be taken to protect the herbage growing around from live stock so that nesting sites may not be interfered with. A gull sanctuary should add considerably to the value of nearby farms and not a little to those even twenty miles away, as was amply demonstrated in 1921.

Many another bird is at work along similar lines to the gulls. Horned Larks providing a cutworm every two minutes throughout the day to their nestlings; the Crow, which has been known to gather 72 wireworms for a single meal; the Upland Plover, almost exclusively a grasshopper feeder and Meadowlarks and Grouse, whose families are largely reared on the same diet. These are but a few of the many which might be enumerated, to say nothing of those species that feed upon the pests affecting trees. But enough has surely been written to show what the facts are. Pests have increased through man's activities, largely because he provided abundance of food for them, but also because he killed or banished many of his best friends. A majority of these friends are still living in reduced numbers and with care may be induced to return. As they do so, insect outbreaks will grow less frequent and the balance will become more as it was before man upset it.

SOME OF CAPTAIN HENRY TOKE MUNN'S OBSERVATIONS ON THE BIRDS OF BAFFIN ISLAND AND VICINITY

BY HOYES LLOYD

It was recently my pleasure to discuss the bird life of the Eastern Canadian Arctic archipelago with Captain Henry Toke Munn, F.R.G.S., F.Z.S. who has had long experience in that district. As any information concerning the bird life of this vicinity is considered valuable, I was glad to have his permission to prepare for publication

the notes taken during our conversation.

There is a large loomery (species ?) on Bylot Island, near Ponds Inlet, and the natives obtain the eggs of these birds to a considerable number in June. Captain Munn once watched a polar bear catching some of the adult birds from this colony. The birds were diving under the ice

floe and frequently one would approach close to where the bear had located itself. Whenever a bird came within reach the bear would capture it with one paw.

Anas platyrhynchos—MALLARD

Captain Munn once saw a female Mallard at Ponds Inlet.

Harelda hyemalis—LONG-TAILED DUCK

This species is not common in the vicinity of Bylot Island although very abundant on Southampton Island. Vast flocks were seen in the autumn there.

Somateria mollissima borealis—NORTHERN EIDER.

Eiders, undoubtedly of this sub-species, are common and breed in Eclipse Sound. There is no suitable breeding-ground for them in Ponds Inlet vicinity.

Somateria spectabilis—KING EIDER.

Common, breed in Eclipse Sound, but not in Ponds Inlet vicinity.

Chen hyperboreus nivalis—GREATER SNOW GOOSE.

Snow Geese, believed to be of this sub-species because of the locality, are abundant and breed on Bylot Island and Baffin Island in the vicinity

of Ponds Inlet. Both dogs and natives hunt the flightless moulting birds for food. The Blue Goose was unknown to Captain Munn.

Branta canadensis hutchinsi—(Sub-species ?)

Captain Munn shot a *Branta canadensis* about the size of a Mallard on Southampton Island.

Grus americana—WHOOPIING CRANE

Captain Munn saw two Whooping Cranes on Baffin Island near Ponds Inlet in the summer of 1912.

Grus canadensis or *Grus mexicana*.

Common on Southampton Island.

Nyctea nyctea—SNOWY OWL.

Two live specimens brought out and presented to the London Zoological Society.

Corvus corax principalis—NORTHERN RAVEN.

At least a dozen pairs of Ravens have wintered in one season in the Ponds Inlet vicinity, where the species is resident and very common. The natives believe the Raven is able to stand the severe cold because he makes an igloo. As other birds sleep under the snow this may well be the Raven's method of withstanding severe weather.

PROSECUTIONS

Migratory Birds Convention Act and Northwest Game Act, by Officers of the Dominion Parks Branch and Royal Canadian Mounted Police.

MIGRATORY BIRDS CONVENTION ACT

REPORTED DURING THE PERIOD—OCTOBER 24,
1921—FEBRUARY 15, 1922.

Joseph Lachance, S.S. "Rouville", Quebec. Killing a Herring Gull. Fine \$10.00 and costs.

Joseph Lachance, S.S. "Rouville", Quebec. Obstructing a Game Officer in the discharge of his duty. Fine \$10.00 and costs.

Edward O. Barber, Alberton, Prince Edward Island. Selling Ducks. Fine \$10.00 and costs.

Thomas Brodrick, Alberton, Prince Edward Island. Having Ducks exposed for sale. Fine \$10.00 and costs.

Hunter Weeks, Alberton, Prince Edward Island. Buying Ducks. Fine \$10.00 and costs.

Russell Oulton, Alberton, Prince Edward Island. Trafficking in Ducks. Fine \$10.00 and costs.

A. E. Holt, Erskine, Alberta. Killing Loons in close season. Fine \$10.00 and costs.

Russell Hirtle, Oakland, Lunenburg County, Nova Scotia. Having in possession a Great Blue Heron. Fine \$10.00 and costs.

Clyde Hirtle, Big Tancook Island, Lunenburg County, Nova Scotia. Shooting Coots in close season. Fine \$30.00 and costs.

Garnet Young, Big Tancook Island, Lunenburg County, Nova Scotia. Shooting Coots in close season. Fine \$30.00 and costs.

Captain Mercier, S.S. "Rouville", Quebec. Obstructing a Game Officer in the discharge of his duties. Withdrawn.

Joseph Tremblay, St. Agnace St., Chicoutimi, Quebec. Having in possession a Robin. Fine \$10.00 and costs.

Rufus Nieforth, Halifax, Nova Scotia. Ducks exposed for sale. Fine \$10.00 and costs.

Beatrice Nieforth (Mrs.), Halifax, Nova Scotia, Ducks exposed for sale. Fine \$10.00 and costs.

Joseph Dumphy, Halifax, Nova Scotia. Ducks exposed for sale. Fine \$10.00 and costs.

Richard Carter. Halifax, Nova Scotia. Ducks exposed for sale. Fine \$10.00 and costs.

Allan Menzie, Dalhousie Junction, Restigouche County, New Brunswick. Attempting to kill migratory game birds between 9 p.m. and 12 p.m. Seizure: one shot-gun. Fine \$20.00 and costs.

CRINE BIO

Irving Menzie, Dalhousie Junction, Restigouche County, New Brunswick. Furnishing false information to a Game Officer. Seizure: one shotgun. Fine \$20.00 and costs.

Thomas Williams, Musquodoboit Harbour, Halifax County, Nova Scotia. Selling Ducks. Fine \$10.00 and costs.

Frederick Bowser, Musquodoboit Harbour, Nova Scotia. Selling Ducks. Fine \$10.00 and costs.

Allan Menzie, Dalhousie Junction, Restigouche County, New Brunswick. Attempting to kill migratory birds by the use of a "night light." Fine \$20.00 and costs.

Irving Menzie, Dalhousie Junction, Restigouche County, New Brunswick. Attempting to kill migratory birds by the use of a "night light." Fine \$20.00 and costs.

Irving Menzie, Dalhousie Junction, Restigouche County, New Brunswick. Attempting to kill migratory birds between the hours of 9 p.m. and midnight. Fine \$20.00 and costs.

Dominique J. Mallet, Shippigan, New Brunswick. Having in possession a Canada Goose. Fine \$10.00 and costs.

David Saunders, Yarmouth, Nova Scotia. Having Ducks for sale. Fine \$10.00 and costs.

Clement Pitman, Proprietor People's Market, Yarmouth, Nova Scotia. Having ducks for sale. Fine \$10.00 and costs.

John S. Cyr, St. Leonard, New Brunswick. Having in possession a Great Blue Heron. Fine \$10.00 and costs.

Robert Bishop, Greenwich, Nova Scotia. Killing one Hudsonian Curlew. Fine \$10.00 and costs. (Suspended).

A. E. Booth, 1684 8th Ave. W., Vancouver, British Columbia. Having in possession a Duck in close season. Fine \$10.00 and costs.

N. Routley, 55 10th Ave. W., Vancouver, British Columbia. Having in possession a Flicker in close season. Suspended Sentence.

W. Viau, 337 Amherst St., Montreal, Quebec. Having in possession a portion of skin and plumage of a Loon. Fine \$10.00 and costs.

Dumouchel & Cockburn, 12 Craig St. E., Montreal, Quebec. Receiving a Pileated Woodpecker which had been illegally killed. Fine \$10.00 and costs.

A. E. Houle, 288 Christopher Columbus St., Montreal, Quebec. Having in possession a portion of the skin and plumage of a Loon. Fine \$10.00 and costs.

A RESOLUTION BEARING ON THE INTRODUCTION OF NON-NATIVE PLANTS AND ANIMALS INTO THE NATIONAL PARKS OF THE UNITED STATES

WHEREAS, One of the primary duties of the National Park Service is to pass on to future generations for scientific study and education, natural areas on which the native flora and fauna may be found undisturbed by outside agencies; and

WHEREAS, The planting of non-native trees, shrubs or other plants, the stocking of waters with non-native fish, or the liberating of game animals not native to the region, impairs or

destroys the natural conditions and native wilderness of the parks:

BE IT RESOLVED, That the American Association for the Advancement of Science strongly opposes the introduction of non-native plants and animals into the national parks and all other unessential interference with natural conditions, and urges the National Park Service to prohibit all such introductions and interference.

EDITORIAL

PRESERVE THE NATIONAL PARKS

Certain areas in various parts of Canada, including some of the most beautiful and attractive regions in the western mountain ranges, have been set aside as Canadian National Parks and are being maintained as such. The Parks thus wisely created, if maintained intact, will provide for present and future generations unmarred and inspiring examples of our wild life and wonderful scenery. The Canadian people will be always the better because of their possession and enjoyment of these great,

health-giving out-of-doors playgrounds. The benefit conferred in this way will increase continually as the Dominion becomes more and more settled.

Canada's National Parks are of great value also because of the world-wide advertisement which they give to some of the prominent natural features of the Dominion and because they are the means of bringing, through the tourist travel which they attract, a large and increasing revenue to this country. Such names as Banff and Lake Louise

are heard the world around.

Attacks by private commercial interests, such as in recent years have been made repeatedly upon the National Parks of the United States, are undoubtedly to be expected in Canada also. Such attacks are usually disguised so as to make it appear that, as water-power or irrigation projects, they are in the public interest. The most innocent-looking and least harmful project may be put forward at first, in the hope of creating a precedent which may be used for the fullest exploitation of the natural resources of the Parks.

An abundance of water is available outside of our Parks for purposes of irrigation and water-power development. The great incentive to carrying out projects of this sort inside a National Park rather than elsewhere is the hope of the private interests concerned that they may be relieved of the necessity of paying for lands flooded and other damage done, which would not be the case if the damage were done to privately-owned property outside of

a Park. Attempts at commercial development and exploitation of Park areas are attempts of private and local interests to reap abnormal profits by destroying and disfiguring the property of all the people of the Dominion.

If even one commercial project should succeed in becoming established in Canada's National Park system, the way would be opened for endless spoliation, which would render the Parks useless for the purposes for which they were set aside. All who are interested in the preservation for the public use and enjoyment of the grand natural beauties and the wild life of Canada's most attractive regions should watch carefully for any attack upon the National Parks, and should be prepared to co-operate fully in bringing the sentiment of the people at large to bear to prevent private inroads upon their property. An informed public sentiment is the only effective means of meeting powerful private attacks upon the public interests. Preserve the National Parks!

REVIEWS

THE CONDOR FOR 1921.

No. 1, JANUARY—FEBRUARY.

Suggestions regarding the *Systema Avium*. By Richard McGregor, pp. 15-18.

This is a discussion of a new Check List now under consideration that is planned as a Nearctic volume to a *Systema Avium*. Other volumes covering other geographic divisions are to be prepared by British ornithologists. The suggestions are interesting and demand full consideration in this difficult compromise of conflicting ideas. Whether all the proposals are to be adopted or not, these ideas of a broad-minded worker may assist in clarifying the problem.

Concerning the Status of the Supposed Two Races of the Long Billed Curlew. By Joseph Grinnell, pp. 21-27.

This is a discussion of the tenability of the new race described by Bishop (*Auk*. XXVII, 1910, pp. 59-60), and upheld by both Oberholser and Ridgway. The question as to whether *parvus* Bishop or *occidentalis* Woodhouse is the proper name for this form is passed over as immaterial in the discussion, only the validity of the subspecies itself being brought into question. The investigation is based upon a series of the species made in San-Luis Obispo County, California. After a large series of measurements (the form is separated entirely on size) and some interesting illustrative graphs, Dr. Grinnell decides that they show a gradual series of gradations without any tendency towards grouping at the extremes, and

the grounds of subspecific differentiation are therefore, too slight for nomenclatural recognition. This, from such a refined "splitter" as Dr. Grinnell, carries unusual weight. In connection with this question the present reviewer might call attention to two sets of eggs of this species in the Victoria Memorial Museum, differing in size sufficiently to represent the two proposed races, but obviously from geographical considerations both belonging to the postulated smaller one. A typical egg from a set collected by W. Raine, 10 miles south of Lake Rush, Saskatchewan, June 2, 1894, measures 2.8 x 1.9 inches. A typical egg from the other set collected by P. A. Taverner at Cypress Lake, Saskatchewan, May 24, 1921, measures 2.56 x 1.78 inches. It is taken for granted that they were laid by comparably sized birds. These two sizes from one field near the extreme extension of the range of one form largely supports Dr. Grinnell's contention.

The larger a species and the more extreme its specialization, the greater is the expected individual and age variation. This is especially so in species that may be regarded as overgrown members of their family. The Long-billed Curlew is enormous for a wader, and its bill, especially lengthened and departing far from the ancestral type, grows for a considerable period after apparent maturity and is subject to great variation. The Canadian prairie provinces covering the ranges of the species are today well settled in comparison with much of the bird's range in the

south. The bird has also suffered considerably from its contact with settlement, as would be expected of a large palatable bird so easy to approach in its breeding season. Its individual expectancy of life and the relative number of very old specimens in proportion to population have become considerably reduced in these northern areas. It is to be expected that the average of specimens collected today in this section would measure smaller than in more southern areas where there are large expanses where man has interfered with it less. On the present evidence it seems the course of wisdom at least to suspend judgment upon the status of these races of Curlew.

Notes on some Specimens in the Ornithological Collection of the California Academy of Sciences. By Joseph Mailliard, pp. 28-32.

Consisting of notes and descriptions of specimens of nineteen species. The most interesting of these, in the light of the questioned specific identity of the Little Brown Crane, are series of measurements of ten Little Brown and eight Sandhill Cranes. There is no overlapping amongst them shown.

In From Field and Study:—

Distribution of Townsend Fox Sparrow. By George Willett, pp. 36-37.

Re Swarth's Revision of the Fox Sparrows reviewed in these pages previously, Mr. Willett states that *Passerella iliaca townsendi* commonly winters as well as breeds at the southern end of the Alexander Archipelago, a fact that should somewhat modify some of Mr. Swarth's conclusions expressed in the above work.

NO. 2, MARCH—APRIL.

The Priblof Sandpiper. By G. Dallas Hanna, pp. 50-57.

An account of the habits and nesting of this rare bird. One plate showing the eggs.

The Sitkan Race of the Dusky Grouse. By H. S. Swarth., pp. 59-60.

Describing a new sub-species, *Dendragopus obscurus sitkensis*. It has been suspected for some time that the Blue Grouse of the northern coast was distinct from *fuliginosus* but lack of material has hitherto deterred designation. The principal character is an increased redness of color. The specimens cited come mostly from the islands of the Alaska pan-handle from Sitka to Wrangell Island. Probably the race extends south to the Queen Charlotte Islands, specimens from which have long attracted attention to this same character.

In From Field and Study:—

A Record for the Emperor Goose in Oregon. By Alex. Walker, p. 65.

Announces the taking of a specimen on the ocean beach at Hetarts, Tillamook County, Oregon, Dec. 31, 1920. This suggests that stragglers may be still looked for along the British Columbia Coast.

An Afternoon with Holboell Grebe. By A. D. Henderson, pp. 68-69.

Describes the bird diving with young on its back at Silvermore Lake, Alta.

NO. 3, MAY—JUNE.

The Probable Status of the Pacific Coast Skuas. By A. C. Bent, pp. 78-80.

The great difficulty of obtaining specimens of pelagic birds and the fact that most of them breed on lonely oceanic islands in the southern hemisphere very difficult of access, has prevented our knowledge of them keeping pace with that of more easily studied species. With new light thrown on these birds through the recent work of Beck and others, Mr. Bent has re-examined some of the western material and announces that California specimens in the California Academy of Sciences can be referred to the Chilean Skua, *Catharacta chilensis*, thus adding a new species to the North American List. By inference he refers *Megalestris skua*, reported in the *Condor*, 1918, taken at sea near the boundary between British Columbia and Washington waters, as the same. This will cause a change in our West Coast list, the elimination of the Skua and the addition of the Chilean Skua.

New Bird Records for North America, with Notes on the Priblof Island List. By Joseph Mailliard and G. Dallas Hanna., pp. 93-95.

This gives notes on the occurrence of seven species in these far-flung islands and adds two to the North American List.

In From Field and Study:—

Notes on the Hypothetical List of California Birds. By J. H. Fleming, pp. 95-96.

Mr. Fleming discusses the cases of three species hypothetically included in the California list on the basis of specimens in the British Museum. The species in question are Woodcock, Hudsonian Godwit and Arizona Cardinal. Having had opportunity to examine these specimens, November, 1920, he decides they will have to be disregarded through insufficient evidence as to the place of their origin.

NO. 4, JULY—AUGUST.

Genera and Species. By Richard McGregor, pp. 127-129.

This is a restrained and moderate but very cogent protest against the immoderate subdivision of the generic conception, seconding Dr. Witmer Stone's plea, *Science*, Vol. 51, 1920, p. 427, for

the use of subgenera (not used in specific nomination) for the finer divisions that it may seem expedient to recognize.

In From Field and Study:—

A Murre Tragedy. By R. H. Palmer, p. 135.

Calls attention to the danger to sea bird life of the increasing amount of oil spread over the sea surface by tankers and oil-burning ships. The harm seems to be done by ships ballasting their empty tanks with sea water. When this is pumped out before coming into harbor, much waste oil is evacuated with it. This spreads over the sea, where it penetrates the plumage of swimming birds, mats the feathers together, allows the water to reach the skin and causes their slow death. Measures of regulating this practice are now being considered. Fortunately the waste of valuable oil is an additional reason for care in this direction and shipping companies are not showing themselves antagonistic to the humanitarian efforts of the authorities.

NO. 5, SEPTEMBER—OCTOBER.

A Twelvemonth with the Shorebirds. By Allan Brooks, pp. 151-156.

This is a history of the author's experience with shorebirds from early January, 1920, at Comox, Vancouver Island; after April 15th near Massett, Queen Charlotte Islands; a short time in the fall in Alberta and the winter at Jupiter, Florida. It contains a very great deal of interest relating to the migrations and habits of the waders.

Bird Notes from Southeastern Alaska. By G. Willett, pp. 156-159.

Annotations on thirty-six species, mostly from the vicinity of Wrangell. It contains much interesting material, conspicuous amongst which is The Coast Pygmy Owl, *Glaucidium gnoma grinnelli*, that seems not uncommon as far north as Wrangell.

The Northward Range of the Allan Hummingbird. By Tracy L. Storer, pp. 160-162.

As the difference between Allan's and the common Rufus Hummingbird is only positively expressed by the shape and color of one tail feather, considerable mis-identification regarding the former has found its way into print. Mr. Storer has examined available material and decides that Allan's Hummingbird has never been noted in British Columbia or Oregon and he can substantiate but two from Washington. The reviewer has known for some time that the British Columbia specimen cited in the Catalogue of Canadian Birds was actually the Rufus. The bird should be dropped from the Canadian list.

Under Editorial Notes and News:—

The report of the Provincial Museum, Victoria, British Columbia, for the year 1920, by F.

Kermode, is noted. Prominence is given to the statement therein that the introduced Chinese Starling, *Acridotheres* (or *Aethiospar*) *crystalinus*, has become well established in the city of Vancouver, and that not less than 1,200 birds roost on the ledges of the buildings. As though the House Sparrow was not a sufficient lesson in the introduction of species we have permitted another undesirable to complicate still further the difficult problems of our civilization. Without doubt organized systematic effort would eradicate this bird now. In a few years' time, as with the Sparrows, millions may be eventually spent without effect.

NO. 6, NOVEMBER—DECEMBER.

The Mind of the Flock. By R. C. Miller, pp. 183-186.

Discussing how whole flocks of birds respond to stimuli as though of a single mind. This can be seen especially in the wheelings and circlings of groups of flying waders and is an intensely interesting subject.

In From Field and Study:—

Eclipse Plumage of the Cinnamon Teal. By Frank Stephens, p. 194.

Describes the hitherto unrecorded eclipse plumage of this bird. The "Eclipse plumage" is peculiar to ducks and is an interpolated plumage between the nuptial or spring and the fall plumage acquired by the male during the season of wing moult. It usually resembles that of the female. During it, birds hide very closely and are very difficult to secure. Eclipse plumages of any of the ducks are comparatively rare in collections.

In an Editorial, p. 197.

The Editor discusses the use and abuse of the field-glass as an ornithological study adjunct. Some of his criticisms of the instrument are well founded. The writer knows that for many years he marked and identified birds in the field with, to him, satisfactory certainty, with nothing but the naked eye. Nowadays he feels that it is hardly worth while looking at a live bird without ocular assistance. Undoubtedly we are apt to lean too heavily upon such aids and neglect our natural powers of observation.

Notice is given of the work during the past summer of Mr. C. DeBlois Green on Porcher Island near Prince Rupert, B.C., It is said that he has learned hitherto unknown facts regarding the breeding of the Marbled Murrelet, a bird common enough in breeding condition along our entire west coast throughout the summer but whose nest has not yet been positively identified.

P. A. T.

TERRITORY IN BIRD LIFE.

BY H. ELIOT HOWARD

*With illustrations by G. E. Lodge and H. Gronvold,
London, John Murray, 1920, 8vo., pp. 308,
pl. 11, plans 2.*

A most interesting book and one that it will repay any student of avian behavior to read. It crystallizes thoughts that have been latent in many of us. We have been so accustomed to the idea that male birds fight each other for the favor of the female that we have scarcely thought to question it. When, however, Mr. Howard advances another explanation we realize that he is but stating that of which we have long been subconsciously aware. He advances that, when birds fight in the spring time, it is not directly for mates that they contend, but to possess or defend territory in which to rear their families, assume definite proprietary rights and tolerate no competitors. This explains much that was unsatisfactory under the older conventional concept; for males fight females as well as males; females engage others of their own sex and both combine against rival pairs or either individual. The fighting also rarely passes certain geographic boundaries, beyond which differences seem to be forgotten, and on neutral territory birds mix indiscriminately without animosity. These well-known facts do not harmonize with exhibitions of sexual jealousy, but are perfectly reconcilable with a competition for territory. An outline of the theory is as follows:

It is the general rule amongst most of our song birds for the male in spring to return to the nesting ground some little time ahead of the female. His first business is to prospect for and establish ownership in the territory he and his mate are to occupy through the coming season. This territory must contain satisfactory nesting sites and promise of food supplies in sufficient quantity so that the young need never be left unprotected from the elements for longer than their tender constitutions can endure under the conditions normally prevailing during the season of their helplessness. Once possession is established he occupies a prominent observation point within his territory and pours forth his song, by which he warns off trespassers and advertises, to such females as may hear, a vigorous male in breeding condition with property qualifications that will refuse no reasonable offer of matrimony. The female therefore comes to the male's call instead of being wooed through it. This is a reversal of our familiar concepts of the working of sexual selection, but does not deny them in any

essential. The most vigorous male, with the clearest and most incessant song, will be most likely to hold his territory against competitors, or to attract a female. A premium is thus placed on virility in the one case as in the other. When he is joined by a mate, they unite in defence of their territory. Intruders that may seek to establish themselves in too close proximity are immediately attacked and, if possible, driven off. In this, no respect is shown to sex by either bird. A female is as certain to be attacked by either or both of the pair as is a male. Trespassers are, however, usually driven only to the boundaries of the preserve and victories are rarely followed up when this object is achieved. However pugnacious birds may be in their own bailiwick, those of either opposite or the same sex will meet freely on common feeding grounds without evidence of animosity. Non-competitive neighbors are tolerated much closer than are those of similar species. In these struggles the established bird or birds have the advantage. They are fighting with the vigor of determination for home and fireside, while intruders are less determined and, unless desirable localities are at a great premium, will retreat to seek quarters than can be more cheaply acquired. We often see one bird chase another ignominiously away and into its own proper territory, when the tables are reversed, the aggressor becomes the defendant and retires with equal haste before the assault of the late fugitive.

Most of this reads very convincingly in connection with many of our small song birds and we can see the details of it any day in spring or early summer, but the experienced observer will realize what the author does not suggest, that there are species whose modes of life do not fit into the scheme. Species that mate for life do not have to advertise annually for a mate; those that pair before arrival on the nesting ground have other methods of attracting mates. Praecoces, whose young run at birth and can be taken to the food supplies, are relatively independent of the immediate surroundings of the nest, and polygamist species are fundamentally different from the monogamists in all their family relations. The exceptions in these species, however, cannot be regarded as objections to the application of the rule to others. In fact, in studying the reaction of such a law to varying conditions, a more intelligent understanding of its workings can be obtained. Such exceptions, by interpreting it, may be said to prove the rule.

In connection with this book, it is well to read Mr. Mousley's *Singing Tree** which confirms, in

**Auk*, XXXVI, 1919, 339-348.

fact anticipates, much that is here presented. Also Mr. Baldwin's† discoveries of the marital relations of House Wrens in the same and succeeding seasons contains much corroborative material. It is rather surprising that so careful an investigator as Mr. Howard has overlooked these important papers bearing, as they do, intimately on his subject.

A criticism that may not be out of the way is that in spite of the exclusion of this important evidence, the book is padded. Probably the author could have developed his thesis with no loss of weight and with an increase of clarity in half the number of pages. He goes to great length to prove that which can be conceded. The illustrations are photogravures beautifully drawn and reproduced, a credit to both artist and publisher, but they do not bear on the subject in hand. They are portraits of birds in various fighting attitudes that add nothing to the argument and do not illuminate a pertinent idea. As proof that birds fight they are not needed, as illustrations of methods of fighting they do not come within the scope of the work. The plans, however, showing how a field was divided up into spheres of influence in succeeding years by its Lapwing inhabitants, are complementary and valuable additions to the text.

The reviewer is here moved to make formal protest against the all too common practice of the publication of too expensive books on scientific subjects. Knowledge should be made as nearly free to all as possible and books, whose reason for being is the diffusion of knowledge, should be kept within the reach of as many students as is compatible with the end in view. Editions *de luxe*, unless accompanied by a popular edition, are decidedly out of place in scientific fields and should be frowned upon instead of praised and imitated. Good paper, clear type and adequate illustration should be used, of course, but elaborate bindings, deckle-edges, wide margins, large pages within each of which a small island of print floats in a sea of white paper, unnecessarily expensive illustrations and intentionally (I was about to say maliciously) limited editions are to the detriment rather than to the advancement of science and should not be condoned even if they do tend to the personal glory of authors by the high prices attached to the works in second hand catalogues.

Not all of these strictures apply to the work in question, but enough of them do to make a peg on which to hang the complaint. The very fact that the book costs nearly four dollars and a half, Canadian money, sufficiently shows that it is unnecessarily expensive and debarred in

consequence from many private libraries that need it. At a time like this when we have often to forego necessary illustrations or make shift with inadequate ones, we question the good taste that uses them to give fictitious value to works that are complete without them.

P. A. T.

GEOLOGICAL SURVEY OF CANADA, MUSEUM BULLETIN NO. 33, 109 PP., 12 PLS.,
OCTOBER, 1921.

Naturalists whose interests are not limited to the natural history of present day geography will doubtless welcome the group of five palaeontological papers recently published by the Geological Survey as Museum Bulletin No. 33. Biology has its roots so deeply buried in the geologic past that it appears safe to assume that many readers of this magazine will be interested in one or more of the group of five papers published in this Bulletin. The authors include two members of the palaeontological division of the Canadian Geological Survey and three well-known palaeontologists of the United States. The subjects dealt with relate to parts of Canada as far apart as Anticosti Island and the plains of Alberta. The fossils discussed and illustrated represent the Pleistocene, Cretaceous, Devonian, Silurian and Ordovician rocks of Canada and the Cretaceous of Texas.

The papers in the Bulletin are published under the following titles:

Faunal and Sediment Variation in the Anticosti Sequence. By W. H. Twenhofel.

New Species of Devonian Crinoidea from Northern Canada. By Frank Springer.

The Range of certain Lower Ordovician Faunas of the Ottawa Valley, with Descriptions of some new Species. By Alice E. Wilson.

The Fossil Molluscan Faunas of the Marl Deposits of the Ottawa District. By E. J. Whittaker.

Two New North American Cycadeoids. By G. R. Wieland.

Professor Twenhofel sets forth in his paper some very important conclusions from his detailed study of the Anticosti Island Silurian and Ordovician faunas, which should be of interest to all geologists dealing with problems of Palaeozoic correlation. Twenhofel states that "lateral gradation of sediments and faunas may so develop that one type of sediment with its fauna may overlap another—the conditions responsible for one type of deposition migrating laterally with respect to the other. The common interpretation would be "overlap" of the one by the other, a withdrawal of the sea, a land interval, and the development of an unconformity." Twenhofel

†*Abst. Proc. Linn. Soc. of N.Y.*, No. 13, 1918-1919.

does not accept this current interpretation of the lateral changes in the fossil faunas and sediments of Anticosti Island, but states it to be "the purpose of this article to describe examples of sediment and faunal variation in the shallow Ordovician and Silurian seas in which were deposited the sediments which now constitute the rocks of the Anticosti sequence, and to show that in these waters conditions in respect to the processes and results of sedimentation were little different from what they are in seas of the present day."

Mr. Springer's paper describes and figures two new crinoids belonging to the genus *Melocrimes*, from the Mackenzie basin.

The paper by Miss Wilson materially increases our knowledge of the geological range of the several species comprising the Black River and Trenton faunas in the Ottawa Valley, and adds some new species to these faunas. The author has shown all that her investigations have disclosed regarding range of species by means of a series of tables. These indicate at just what point in the section each species makes its first appearance, and just where it disappears from the section. This paper is a good example of the sort of precise work in collecting and studying fossil faunas which is needed to make stratigraphic palaeontology the exact science which it will some day become.

Mr. Whittaker's contribution deals with a fossil fresh-water fauna found in the marls of the Ottawa Valley which, in its time relations, lies between the latest marine Pleistocene interval and the time represented by the living molluscan fauna. Students wishing to study the fresh-water fossils of the Ottawa Valley Pleistocene will find the plates and keys of this paper most

useful. The illustrations of the paper include an aeroplane photograph showing the relation of the fossil marl deposits to the present water level at McKay Lake. So far as the writer is aware, this is the first aeroplane photograph to be used in illustrating a palaeontological paper.

In the paper on fossil cycads, Dr. Wieland has described the first cycad ever recorded from Canadian rocks. The cycads represent a singular and exceptional type of plant which, in the modern world, is confined to the warmer climates. Their short thick trunks have sometimes been called "fossil birds' nests" by quarrymen.

The Canadian specimen of *Cycadeoidea* described by Dr. Wieland appears to be the latest recorded from North America. "In a few words, the known petrified cycadeoids come in with a certain abundance, quickly culminate in variety and number, and then, after long continental distribution, these uniquely specialized forms slowly disappear toward Tertiary time, to recur no more. With them, too, go the *Araucarias*, save that these still persist in South America."

Unfortunately, the plates for this bulletin have suffered greatly at the hands of the printers. The palaeontologists who prepared the excellent plates for these papers will need more than "a drop of patience" if they can forgive the damage done to them by printing the explanations on the backs of the plates. Discarding the nearly universal practice of printing plate explanations on sheets separate from the plates, which in this case are printed on very thin paper, illustrates a variety of economy akin to that which would be displayed by mounting a fine diamond on a brass ring.

E. M. K.

NOTES AND OBSERVATIONS

A BARKING FROG

Everyone who has studied animals at all closely knows that there is a considerable difference in temperament between individuals of the same species, and that because one individual behaves in a certain manner under certain circumstances it is not necessarily true that all individuals will behave in a similar manner.

This individuality of temperament was brought out very clearly in an experience I had last August with a specimen of the Green Frog, *Rana clamitans*, at St. Andrews, New Brunswick. In a very small pool in a little stream on the Golf Links were two of these frogs. They were floating at the surface of the water against the bank, and while one swam away as I approached the other remained stationary. Seeing that it was not timid I took

the opportunity of photographing it, and having done so I reached over and gently stroked its back. I expected it to dart away instantly, but instead of doing so it emitted a sound which can most adequately be described as a bark, and turning about, it snapped at my finger. I tried the same thing again and again with the same result, except that its "barks" became a little louder and its snaps more vicious. The barking sound which it made was utterly unlike anything I have ever heard this species, or any other frog, utter, and if one had not seen the animal which was uttering it he would have had great difficulty in guessing the species of animal from which the note emanated.

A. BROOKER KLUGH.

WHITE GYRFALCON IN ALBERTA:—A fine specimen of the White Gyrfalcon was shot by Mr. Waghorn on his farm at Blackfalds, Alberta, in the act of attacking one of his turkeys in December, 1920. It had been noticed for a fortnight previous to being shot. I saw this rare falcon in Mr. J. H. Grant's taxidermist store in Red Deer in the spring of 1921, and am indebted to him for the above data. The bird is now in the possession of Mr. Waghorn. I believe this is a record for Alberta.

ELSIE CASSELS.

REMARKS ON THE POISON IVY.

When reading Dr. H. T. Gussow's interesting and instructive article on "The Treatment of Skin Irritations due to Poison Ivy"* I was struck by his remark that "Nobody, of course, ever comes knowingly into contact with poison ivy", because it is not in agreement with my personal experience. I have never avoided poison ivy, have often come knowingly into contact with it, and have never been poisoned by it. Most of my boyhood was spent on Long Island, in the State of New York, where the poison ivy often grows as a large creeping plant, climbing to the tops of trees of moderate size, and where persons are frequently poisoned by it. I distinctly remember that, on one occasion, my brother and I cut a branchless "rope" of poison ivy stem, about an inch in diameter, and perhaps ten or twelve feet long, which we at once used in a "tug-of-war", thus smearing our hands freely with the sap which exuded from the freshly cut ends of the piece of stem, but that neither of us suffered any ill effects as a result. I was not in the range of the poison ivy during the unusually hot weather of the summer of 1921, and I have, of course, no means of knowing whether or not I shall be immune to poison ivy poisoning all my life. I may add that my mother, although she has often come into contact with poison ivy, has never been poisoned by it, but that my father was readily poisoned by contact with it on Long Island.

Poison ivy is widely distributed in Nova Scotia, although it does not grow to a large size in that area. Most Nova Scotians do not realize that poison ivy grows in their vicinity, because it seldom or never causes poisoning in their province. Although I resided in Nova Scotia for more than seven years, I cannot recall that a case of poison ivy poisoning came to my attention during that time. Whether this is due to the northern climate and the dwarfed growth of poison ivy in Nova Scotia, or to the comparatively

isolated position of the fauna of the province, or to some other cause, I do not know.

HARRISON F. LEWIS.

FOUNDING OF A NEW CLUB.

On November 22nd, 1921, a number of Toronto naturalists met at the Royal Ontario Museum where they organized the 'Toronto Naturalists' Club. Their purpose was to found an organization which would bring together the men interested in Natural History, and, in so doing, make co-operation possible along various lines of study. Another important purpose was to create a circle of congenial men with mutual interests so that they might enjoy the pleasures resultant from such an association.

The Club is, so far, unique in that it has no officers, the object being to set aside all formality and to place on each man a share of the responsibility for the Club's activities and success. The meetings are led by members, voluntarily and by rotation. The Museum's collections are being used for study, and the resulting discussions bring out many interesting observations and reviews. (It will be here noted that the Museum is rendering a valuable service as well as giving naturalists an incentive to augment its collections.)

It is necessary to restrict the membership of the Club to a small number because an open organization would necessarily lose the original idea of informality and close acquaintance. The following are the founding members:—

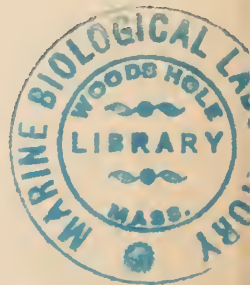
J. L. Baillie
N. K. Biglow
J. R. Dymond
T. B. Kurata
Wm. LaRay
Shelly Logier
Chas. Richards
L. L. Snyder
L. Sternberg
Stuart Thompson
Victor Thomson

The Toronto Naturalists' Club solicits the friendship and acquaintance of naturalists and will be pleased to co-operate with them in any way possible. Address any correspondence to the Toronto Naturalists' Club, The Royal Ontario Museum of Zoology, Toronto, Ont.

L. L. SNYDER.

AN INTERESTING FAMILY OF EIDERS

Some thirty years ago the late Mr. Simon F. Cheney lived on Cheney's Island, a small island of the Grandmanan Group in the Province of New Brunswick. He was a very remarkable



*The Canadian Field-Naturalist, Vol. XXXV., No. 6, pp. 116-118, September, 1921.

man and his knowledge of the birds of his native province was quite exceptional. He had the distinction of taking the last living Labrador Duck, a female which he shot at Sheep Island in Grandmanan fifty-one years ago. This bird he sent to Geo. A. Boardman, of Calais, Maine, who forwarded it to the Smithsonian Institute, Washington, D.C. Incidentally, Mr. Cheney never received a cent for his prize. Eider Ducks used to nest in numbers then at Grandmanan where only a few scattered pairs today breed and rear their young. Mr. Cheney discovered many nests of these birds and frequently placed the eggs under tame ducks and hens. It is a curious fact that Eider Ducks hatched out under hens became blind when about three weeks old. A film formed over their eyes which gradually destroyed their sight. These blind ducklings would invariably die. If, however, the Eiders were hatched out under tame ducks, they never became victims of this blindness. One spring Mr. Cheney discovered an Eider's nest containing six eggs. These he placed under a tame duck and all the eggs hatched. Now the problem was what to feed the ducklings. Mr. Cheney was, however, equal to the occasion. By mixing cornmeal and water he made a thin gruel and, with the addition of sand fleas the birds learned to eat the meal. In picking out the live fleas they would of course get some of the meal and became accustomed to the taste of it. After a time they learned to like the meal and greedily ate it without the addition of the fleas. When the young ducks grew larger, their owner used to take them to a brook and turn over stones in order that the Eiders could catch the small eels and other tiny fish. These young ducks would waddle and swim along behind their master until their appetites were surfeited. They never went far from their pen near the house alone, and were a source of great delight to the many visitors who came to Cheney's Island, among whom were many noted ornithologists of the day. Each night this interesting family of young Eiders was shut up in its pen. Among the visitors to Grandmanan there came a man and his wife from Calais, Maine. The morning after the departure of these tourists Mr. Cheney missed his pets and nothing was heard of them for a month. One day a friend of Mr. Cheney's had occasion to go to Calais and while there heard of a flock of young "Sea Ducks" a woman had in the town. Upon investigation, he discovered they were the same birds which had been stolen from Mr. Cheney. In the night this friend of Mr. Cheney's opened the pen where the ducks were confined and what was their owner's surprise and delight upon opening his back door

the following morning to find the birds huddled together upon the stoop. They waddled about him and flapped their wings and talked to him in their accustomed way, showing every indication of delight at getting back home again. From Cheney's Island to Calais is approximately fifty miles, yet these young ducks came safely back in a very short time after being given their liberty, which is only another instance of how wild birds will yield to kindness and protection.

H. A. P. SMITH,
Digby, N.S.

A CORRECTION.

Under the heading of BIG GAME in my paper on the "Mammals of Islay, Alberta," *Canadian Field-Naturalist*, Vol. XXXV, No. 6, p. 111, there appears a confusion of terms regarding the deer of the west. Since considerable time has elapsed since the writing of this paper, I cannot recall how or why I came to use such terminology. Anyway, I wish to redeem myself. The Mule Deer, Black-tail and Jumping Deer, contrary to the impression conveyed by my writing, are synonymous terms. A few lines farther down the Jumping Deer is more explicitly singled out—an obvious error—for what is meant here is the Northern Virginian Deer or White-tailed Deer. The same is true of the reference to the Jumping Deer at Laurier Lake on page 104. There are but two species of deer in Alberta, the White-tail and the Mule Deer.

T. DEWEY SOPER.

AN AQUATIC HABIT OF THE GREAT BLUE HERON

Mr. Lloyd's account of pigeons alighting in deep water recalls a similar occurrence on the part of the Great Blue Heron, *Ardea herodias*, noted on the Rideau Lakes, Ontario, by myself and D. Blakeley.

We were camping on the shore of Big Island, July 11, 1918. Behind us, in the centre of the island was a large heronry, whilst passing over and continuing across the wide expanse of the lake on their way to feeding grounds was a continuous stream of herons. On several occasions whilst watching the birds departing we saw them drop to the lake level, hesitate a moment and then drop softly into the water. They remained perhaps half a minute there and then, with an easy flap of wings rose and continued their way. The distance was too great to see what they did even with 8X prismatic binoculars. There was a movement of the neck and head that may have

meant picking something from the water, dabbling in it, or drinking.

We thought there might be a shoal out there in mid-lake that we were unaware of and made a point of investigating. We found nothing but deep water anywhere in the vicinity of the occurrence. My mother and sister reported an exactly similar occurrence about a year later on Crow Lake, a small body of water southwest of here, so it is evidently a habit not strictly confined to the birds of this one particular rookery. I do not remember hearing or reading of this trait of the species elsewhere.

P. A. TAVERNER.

A LARGE FLOCK OF EVENING GROSBEAKS AT TORONTO

Early on the morning of March 19th, 1922, L. Sternberg and the writer were tramping through a wooded section northeast of Toronto along a small stream known as Jones' Creek. Many of the expected early spring arrivals were noted as well as resident birds of the season. At least one species observed rewarded us for our early morning activities, namely, a flock of Evening Grosbeaks. We were first attracted to them by their loud chattering and were permitted to watch them for at least ten minutes. Three counts were attempted, after which we were able to place their number at thirty plus, which was a conservative estimate.

When first observed, they were scattered through the trees on the opposite side of the creek. Fortunately, they moved toward us, the entire flock settling on the ice which bordered the creek. They kept up a continuous "peeping" which was the last impression left with us after they rose, as if by a gust of wind, and were lost to view as they circled round a clump of trees.

We noticed an interesting effect of light and shadow as we were watching these birds through our glasses. When the male birds' olive and yellow plumage was under shadow, the color effect was that of rufus, similar to the color on the breast of an American Robin. It is this effect of light that causes the frequent reports of impossible birds to the student.

L. L. SNYDER.

Royal Ontario Museum,
Toronto.

AQUATIC HABITS OF PIGEONS.—Recent notes relating to the aquatic habits of pigeons bring to mind an observation which I made some years ago and which at the time introduced a question if there were any fundamental significance in the fact of a pigeon alighting in the water.

The pigeons on my country place at Stamford, Connecticut, were in the habit of flying down to alight upon a rock projecting above the water in a large stream near my barns. One morning I observed a pigeon which flew to this rock for its morning drink, but finding it already fully occupied by other pigeons, circled about two or three times near the surface and then deliberately alighted in the water. This apparently did not disturb the bird particularly, because it proceeded to drink as it slowly floated down stream and then swam to a shallow sandy bar from which it took flight. The pigeons were an ordinary mixed lot of Blue Rock descendants.

ROBERT T. MORRIS, M.D.

BRONZED GRACKLES AS SCAVENGERS.—Above Mooney's Bay, Rideau River, several Bronzed Grackles were observed coursing back and forth over the surface of the water. At intervals one would drop in gull-fashion and lift some morsel from the water, carrying it to land to devour. Upon closer examination these morsels proved to be dead minnows floating along with the current. June 5, 1918.

C. E. JOHNSON.

FIELD NOTES FROM KAPUKASING, ONTARIO.—While engaged in field-work at Kapuskasing, the first week of July, 1919, I saw a nest built by a pair of Yellow Warblers composed almost exclusively of wads of cotton batting picked up around camp.

A Robin in the same locality posted itself on the rocks below Kapuskasing Falls several evenings and caught winged insects, fly-catcher fashion.

A Red Squirrel with left front foot amputated close to the body was a frequent visitor at camp.

C. E. JOHNSON.

FOOD OF AMBUSH BUGS.—Observed an Ambush Bug (*Phymata wolffi*) seize and kill a Little Wood-satyr (*Neonympha eurymus*) as it lit upon a flowering head of Joe Pye Weed, July 28, 1918. On another occasion, one near this same locality, Dow's Swamp, Ottawa, seized and killed a common Honey-bee upon a head of flowering Golden-rod, August 3, 1920.

C. E. JOHNSON.

BUMBLE-BEES ON BLEEDING HEART.—While admiring the bloom on a plant of Bleeding-heart many of the blossoms were noticed to have been perforated on their upper ends. A few minutes later a Bumble-bee arrived and promptly proceeded to extract nectar through the openings. Several came later and when a blossom was encountered with no mutilation, the bee dexterously lacerated it to obtain the hidden sweets.—Ottawa, May 19, 1918.

C. E. JOHNSON.

The Canadian Field-Naturalist

VOL. XXXVI

OTTAWA, ONT., APRIL, 1922.

No. 4

BIOLOGICAL NOTES ALONG FOURTEEN HUNDRED MILES OF THE MACKENZIE RIVER SYSTEM.

BY M. Y. WILLIAMS

THE following observations were made while on an exploration trip in the Mackenzie River valley for the Geological Survey of Canada in the summer of 1921. The writer travelled in company with Dr. G. S. Hume and Mr. E. J. Whittaker, officers of the Geological Survey, as far as Fort Providence, where Mr. Whittaker started exploration. Dr. Hume and the writer kept in touch with each other throughout the summer.

ITINERARY

From Peace River Town on Peace River, down stream to Lake Athabasca outlet, thence down stream via the Slave River to Great Slave Lake, down the lake 125 miles to the head of Mackenzie River, thence downward 550 miles to the site of the oil well 58 miles below Fort Norman which has so recently stirred the public imagination.

We started at Peace River Town on May 19; our farthest north was the Imperial oil well, fifty odd miles below Fort Norman, which we visited on August 13-14. Returning from Norman on August 21, we reached Smith on September 4, and McMurray, via Athabasca River, September 9; the round trip aggregating about 2700 miles.

TOPOGRAPHY AND FLORA.

The country between Peace River Town and Fort Vermillion is high, rolling prairie, more or less covered with poplar and willow. Below, the general characters are best described as muskeg. Sphagnum moss is the common carpet, black spruce the common forest tree. Sand ridges covered with jack pine are sparsely distributed, and stands of black poplar are interspersed between muskeg areas. Alders border the streams, and white birch and white poplar occupy the better land along the rivers. Numerous lakes occur, mostly of shallow character. Such is the country visited, except where the mountains bring relief to the sight as well as to the landscape. From the mouth of the North Nahannie to Fort Wrigley mountains are the controlling landscape feature, and from here down stream they are rarely more than ten miles from the river. The ubiquitous

muskeg, however, is indomitable and laps the hillsides, and even the tops of the low ridges, holding perpetual frost little below the moss roots.

The wood flowers, including beautiful Ladies' Slippers and other fine orchids, are common in June, while the thrushes sing, accompanied by White-throats, White-crowns and other wood songsters. July is the time of fireweed—the burns on the uplands and mountain sides are pink with it. August is the time of asters, and, after the middle of the month, of the yellowing poplar, of the reddening leaves of the fireweed and, in general, of the fading leaf.

The following species of plants were collected between Ft. Simpson and Ft. Wrigley in 1921 by the author, and identified by Professor John Davidson, botanist in charge of the Herbarium and Botanical Gardens of the University of British Columbia.

Potentilla fruticosa (Shrubby Cinqufoil.)

Achillea millefolium (Yarrow.)

Gentiana sceptrum (Swamp Gentian.)

Parnassia palustris (Grass of Parnassus.)

Elaeagnus argenteus (Buffalo Berry.)

Campanula rotundifolia (Scottish Blue Bell.)

Hedysarum Mackenzii (Hedysarum.)

Galium boreale (Northern Bedstraw.)

Castilleja, sp? (Indian Paint-brush.)

Pinguicula vulgaris? (Butterwort.)

Cypripedium passerinum (Northern Lady's Slipper.)

Cypripedium parviflorum (Small Yellow Lady's Slipper.)

Orchis rotundifolia (Round-leaved orchid.)

Anemone patens wolfgangiana * (Prairie Anemone.)

Asplenium viride. (Spleenwort.)

Campanula Sp?

FAUNA.

According to Preble, the Mackenzie valley, as traversed by the author, falls within the Canadian Life Zone, the Mackenzie and Franklin mountains, however, being within the Hudsonian Zone. As

*This species not previously found east of the Rockies, according to the records in the Geol. Survey Herbarium.

will be seen below, the northern extension of the range of the Meadow Lark suggests affinities with regions hundreds of miles farther south.

NOTES OF OCCURRENCES.

BIRDS.

HOLBOELL GREBE. *Colymbus holboëlli*. One seen on Rocher River, Sept. 6th.

PACIFIC LOON. *Gavia pacifica*. Two positively identified by their grey hoods near mouth of Root River, July 12th, and five at Fort Norman, August 12th. Loons seen on Great Slave Lake, June 7-8th. and near Ft. Wrigley, August 10th, were probably *Gavia imber*.

SLATY-BACKED GULL. *Larus shistisagus*. Several large, dark-backed Gulls seen on Great Slave Lake, June 7th and 8th, resembling the Great Black-backed Gull of the Atlantic coast.

HERRING GULL. *Larus argentatus*? Fairly common on Peace, Slave and Mackenzie Rivers and Willow Lake River (July 1-17). Immature bird seen at Fort Wrigley, July 30th and 31st. Common at Norman. Common at Wrigley Harbour at foot of Great Slave Lake, Aug. 31st and Sept 1st.

RING-BILLED GULL. *Larus delawarensis*. Fairly common on Willow Lake River, July 6-8th. Short-billed gull probably confused with this species.

BONAPARTE GULL. *Larus philadelphia* sp? Common at mouth of Slave River, June 6th. Bill black, no rosy tinge noticed.

COMMON TERN. *Sterna hirundo*. Common on Slave River, June 9th, and at Wrigley Harbour, June 12th. This may be *s. paradisaea*.

BLACK TERN. *Hydrochelidon nigra surinamensis*. Common at mouth of Slave River, June 9th.

WHITE PELICAN. *Pelicanus erythrorhynchus*. Six seen commonly at Smith Rapids, June 1-5.

MERGANSER. *Mergus americanus* or *serrator*. One female seen on Willow Lake River, June 14th. Two at Wrigley Harbour. Aug. 31st and Sept. 1st.

MALLARD. *Anas platyrhynchos*. Common on Peace and Upper Slave Rivers, May 19-30. Female frightened from nest and 12 eggs under spruce tree on dry lands above river about 30 miles above Fitzgerald, May 30th. Several females seen on Willow Lake River, July 1-14. Common on flats of Little Lake below Providence, Aug. 30th. Common Wrigley Harbour, Aug. 31st and Sept. 1st.

BALDPATE. *Mareca americana*. One male taken on Slave River 30 miles above Fitzgerald, May 29th. Common at Wrigley Harbour, Aug. 31st.

GREEN-WINGED TEAL. *Nettion carolinense*. One of the commonest ducks seen throughout trip,

wherever narrow channels or small lakes occur. Broods of year fully grown in lakes east of Wrigley, Aug. 1-7. These were living on local berries of muskeg. Common at Wrigley Harbour, Aug. 31st.

SHOVELLER. *Spatula clypeata*. Commonly seen along E.D. & B.C. Ry., near Lesser Slave Lake, and on Peace River above Carcajou, May 17-20. Common at Wrigley Harbour, Aug. 31st.

PINTAIL. *Dafila acula*. Common on Peace River. Fairly common at Wrigley Harbour, Aug. 31st.

CANVASBACK. *Marila vallisneria*. Several seen in bag of a hunter at Fort Chipewyan, Sept. 7th.

AMERICAN SCAUP DUCK. *Marila marila*. Common on Peace River in small flocks, May 19-28.

BUFFLE-HEAD. *Charitonetta albeola*. Common on Peace River. Female at two islands 30 miles below Simpson, June 20th. Females also seen on Willow Lake River, July 10th and at Old Wrigley, July 23rd.

AMERICAN GOLDEN-EYE. *Clangula clangula americana*. Common on Peace River; male and female taken. Female and fourteen downy young, 35 miles below Fort Simpson, June 28th. Female and eight large downy young east of Wrigley, August 1st, living on young clam shells the size of peas.

WHITE-WINGED SCOTER. *Oidemia deglandi*. Seen on Great Slave Lake, June 8-9th.

SURF SCOTER. *Oidema perspicillata*. Generally common throughout region. Except for the occurrences noted above, no breeding ducks were observed and they do not appear to nest in large numbers along the Mackenzie river where visited.

SNOW GOOSE. *Chen hyperborea*. A flock of 15 seen in Little Lake below Providence, Aug. 30th. These were probably the Lesser Snow Geese. One seen in hands of hunter at Fort Chipewyan, Sept. 7th.

CANADA GOOSE. *Branta canadensis*. Several flocks seen on Peace River. One taken. Reported common on Carcajou River by Mr. Link, and on Trout River above Providence by Mr. Whitaker.

AMERICAN WHITE-FRONTED GOOSE. *Anser albifrons gambeli*. Birds probably of this species, locally called "Brant," common on Slave River and in flocks along length of Mackenzie traversed.

AMERICAN BITTERN. *Bolaurus lentiginosus*. One heard by party at Wrigley Harbour, foot of Great Slave Lake, June 12th.

CRANE. *Grus canadensis*? One seen in wet muskeg 3 miles back of Two Islands Village, June 18-20 (about 30 miles below Fort Simpson). This was evidently a breeding female as it frequented one locality and made considerable dis-

turbance while running away. The color was warm brown.

SEMI-PALMATED SANDPIPER. *Ereunetes pusillus*. Two doubtfully identified east of Wrigley, Aug. 3rd.

GREATER YELLOW-LEGS. *Totanus melanoleucus*. Several near mouth of Nahanni river, June 27th; one on Willow Lake River, July 9th; one near Old Wrigley, July 20th; 6 east of Wrigley, Aug. 6th.

LESSER YELLOW-LEGS. *Totanus flavipes*. Several seen in vicinity of Wrigley appeared to be too small to belong to last species and probably belong to the smaller species.

SOLITARY SANDPIPER. *Helodromus solitarius*. A pair with young seen at Two Island Indian village, June 16-28. One on Willow Lake River, July 7th; common at Norman, Aug. 12-14.

SPOTTED SANDPIPER. *Actitis macularia*. Very common. Nest of 4 eggs on Willow Lake River, July 8th. Young seen on Willow Lake and Mackenzie Rivers north to Wrigley, July 8-18. Common to Norman and Oil Well.

AMERICAN GOLDEN PLOVER. *Charadrius dominicus*. One male seen on top of Bear Rock, Aug. 12th, and approached to within 10 feet.

SEMI-PALMATED PLOVER. *Aegialitis semipalmata*. Several seen on Peace River, May 20-30. and on Willow Lake River and at Old Wrigley, July 12-22.

SPRUCE GROUSE. *Canachites canadensis*. Fairly common in spruce of muskeg from Fitzgerald to Norman. Female and downy young, June 21st, on trail 30 miles below Simpson. Female and 12 young near Old Wrigley, July 19th. Common at Wrigley Harbour, Aug. 31st. Some seen may have been *C. franklini*.

RUFFED GROUSE. *Bonasa umbellus*. Three females with young on trail 30 miles below Simpson, June 20-25. Twelve half-grown young near Old Wrigley, July 22nd. Species seen commonly as far north as Wrigley, Aug. 1st. This is probably the Gray Ruffed Grouse.

ROCK PTARMIGAN. *Lagopus rupestris*. One seen on Cap Mountain, 15 miles east of Fort Wrigley, Aug. 5th.

SHARP-TAILED GROUSE. *Pediacetes phasianellus*. Reported common at rapids 35 miles up Bear River, Aug. 15-24.

MARSH HAWK. *Circus hudsonius*. Seen once or twice on Peace River. One male seen at Wrigley Harbour, June 12th. One female on Willow Lake River, July 13th; one female at Norman, Aug. 13th; one female taken at Norman, Aug. 23rd.

SHARP SHINNED HAWK. *Accipiter velox*. Fairly common at Norman, Aug. 11-25. A female taken at Wrigley Harbour, Aug. 31st, and a male

Sept. 1st. They were following rusty blackbirds.

AMERICAN GOSHAWK. *Astur atricapillus*. One immature bird seen in Jack pine forest east of Fort Wrigley, Aug. 3rd.

RED-TAILED HAWK. *Buteo borealis*. Many seen. Immature bird in dark plumage shot near mouth of Slave River, June 8th. This one had lost about $\frac{1}{2}$ inch of hind toe. Common in Jack pine sandy knolls 30 miles below Simpson, June 20-25. Seen commonly on Willow Lake and Mackenzie River north to Wrigley, July 1-30. One seen 30 miles below Wrigley, Aug. 10th. One seen carrying rabbit at Smith Creek, July 26th. This is probably the Western Red-tail.

DUCK HAWK. *Falco peregrinus anatum*. Several pairs seen at gypsum cliffs, Slave River, May 29th. Two nests in recesses in gypsum cliffs about 40 feet above the water, two large young sitting in one nest. Two seen at Rock-by-the-Riverside, Aug. 7-8th; two at Bear Rocks, Fort Norman, Aug. 14-19, on which dates a large female was taken. One seen at Wrigley, Aug. 18th, and one at Providence, Aug. 30th.

PIGEON HAWK. *Falco columbarius*. Doubtfully identified on Willow Lake River, July 13th. A pair seen at Norman, Aug. 12-16. One was seen to catch a cliff swallow on the wing.

SPARROW HAWK. *Falco sparverius*. One seen on Lone Mountain at mouth of Nahanni River, June 28th. One on Willow Lake River, July 2nd. Several at Wrigley, July 30th, and fairly common at Fort Norman, Aug. 12-19.

AMERICAN OSPREY or FISH HAWK. *Pandion haliaetus carolinensis*. Absent on muddy waters. One seen at Simpson, Aug. 29th, and one at Wrigley Harbour, Aug. 31st, and one, Sept. 1st.

GREAT GRAY OWL. *Scotiaptex nebulosa*. One seen in spruce woods 14 miles above Fort Wrigley, July 28th. A female (?) shot at Athabasca Landing by Wm. Fowler, Jan. 1922 and sent to the writer.

AMERICAN HAWK OWL. *Surnia ulula caparoch*. One seen in black spruce in muskeg near Fort Norman, Aug. 13th. One male taken at Wrigley Harbour, Aug. 31st.

BELTED KINGFISHER. *Ceryle alcyon*. Generally distributed. One seen most days but commoner on clear waters, e.g. the Willow Lake River. Seen at Fort Norman, Aug. 12-14, and at Simpson, Aug. 29th.

HAIRY WOODPECKER. *Dryobates villosus*. Heard on Willow Lake River, July 10th. Common in vicinity of Fort Wrigley, July 22—Aug. 7. This is doubtless the Northern Hairy.

YELLOW-BELLIED SAPSUCKER. *Sphyrapicus varius*. Common along Peace River, May 20-30.

FLICKER. *Colaptes auratus*. Seen commonly on Peace River, June 19-29th, and fairly common-

ly along Mackenzie River as far north as Fort Wrigley, one or more being seen or heard every day, July 4—Aug. 7th. One seen at Wrigley Harbour, Sept. 1st. This is probably the Northern Flicker.

NIGHT HAWK. *Chordeiles virginianus*. Common. Three nests and eggs seen on Jack pine sand knolls 30 miles below Fort Simpson, June 18-27. Common in evenings north to Fort Wrigley in July and till Aug. 9th, when we went down river.

PHOEBE. *Sayornis phoebe*. Common at posts and Indian settlements along Peace, Slave and Mackenzie rivers north to Fort Wrigley. A pair nesting at Two Island Indian village, 30 miles below Fort Simpson, June 17-27. Heard at mouth of Willow Lake River, July 1-2, and 12-16. Nest and five young seen at Old Wrigley, July 22nd.

OLIVE-SIDED FLYCATCHER. *Nuttallornis borealis*. Notes heard commonly along Peace, Slave and Mackenzie rivers during June and on Willow Lake River, until July 13th. One taken at Bear Rock, Fort Norman, Aug. 23rd.

LEAST FLYCATCHER. *Empidonax minimus*. Heard commonly along Mackenzie River, June 21-30, and also on Willow Lake River, July 12th.

CANADA JAY. *Perisoreus canadensis*. Fairly common along whole route. Seen or heard practically every day on Willow Lake and Mackenzie Rivers north to Wrigley, during July and Aug. 1-7. One seen at Norman, Aug. 13th, one at Fort Simpson, Aug. 29th, common at Wrigley Harbour, Aug. 30-31.

NORTHERN RAVEN. *Corvus corax principalis*. A few seen along Peace River, May 19-29. Common at mouth of Willow Lake River, at Wrigley, Norman, Simpson and Providence or near posts, river mouths and where mountains flank rivers.

RED-WINGED BLACKBIRD. *Agelaius phoeniceus*. Common on sloughs near Carcajou, Peace River, May 21st. This is doubtless the Northern Red-wing.

WESTERN MEADOWLARK. *Sturnella neglecta*. One bird seen at Two Island Indian village 30 miles below Simpson, June 17th. Reported taken at Simpson by Capt. Mills.

RUSTY BLACKBIRD. *Euphagus carolinus* sp? Seen at Two Island Village, June 25th. Two seen at Willow Lake River, July 17th. Flock seen at Providence, Aug. 29th, and several flocks seen at Wrigley Harbour, Aug. 31st.

WHITE-WINGED CROSSBILL. *Loxia leucoptera*. Common near Two Islands, June 20th. Heard and seen every day between Willow Lake River and Wrigley, July 2—Aug. 10; at Simpson, Aug. 29th, and Wrigley Harbour, Aug. 30-31.

SNOWFLAKE. *Plectrophenax nivalis*. A flock seen at Fort Norman, Aug. 19th.

ENGLISH SPARROW. *Passer domesticus*. One female seen commonly at Two Islands Indian village, where it entered a cabin occupied by us, June 26-27.

WESTERN SAVANNAH SPARROW. *Passerculus sandwichensis*. Small dark sparrows probably of this species are common along Mackenzie River, but are so retiring that they were not satisfactorily identified.

WHITE-CROWNED SPARROW. *Zonotrichia leucophrys*? Common, in full song, and nesting at Two Islands, June 17-28th. In song on Willow Lake River, July 12-14. This may be *Z. leucophrys gambeli*.

WHITE-THROATED SPARROW. *Zonotrichia albicollis*. Common everywhere. In song until July 18th (near Old Wrigley). Seen at Wrigley Harbour, Aug. 31st.

CHIPPING SPARROW. *Spizella passerina*. Common at Two Islands and on Willow Lake River, June 17-July 14. This is doubtless the Western Chipping Sparrow.

SLATE-COLORED JUNCO. *Junco hyemalis*. Nesting along Slave River, May 30th. Common everywhere.

ROSE-BREASTED GROSBEEK. *Zamelodia ludoviciana*. Common at Peace River Town and at Fitzgerald (May 2nd and 3rd.)

CLIFF SWALLOW. *Petrochelidon lunifrons*. Hundreds of nests on face of rock cliffs, Peace River, and birds present May 20—23. One bird seen at Wrigley, Aug. 10th, one at Norman Aug. 13th.

TREE SWALLOW. *Iridoprocne bicolor*. Several seen on Willow Lake River, July 5th.

BANK SWALLOW. *Riparia riparia*. Hundreds of holes in sand banks of Willow Lake River, the river between the Two Mountains and in the Tertiary soft sandstone beds in the vicinity of Norman. Birds seen at nests on Willow Lake River, July 2nd and 15th, and several seen at Wrigley, August 10th.

RED-EYED VIREO. *Vireosylva olivacea*. Probably common, but never satisfactorily identified. A bird with yellow belly seen at Wrigley Harbour, Aug. 31st, might be the Philadelphia Vireo, *Vireo philadelphicus*.

YELLOW WARBLER. *Dendroica aestiva*. Common at Peace River Town, May 18th and 19th. One seen at Willow Lake River, July 16th. One at Wrigley, Aug. 8th.

MAGNOLIA WARBLER. *Dendroica magnolia*. One seen at sand hills back of Two Islands, June 25th.

WATER-THRUSH. *Seiurus noveboracensis*. Common in swamp at Fitzgerald, June 1st to 5th. One on Willow river, July 9th. This is probably the Grinnell Water-thrush.

AMERICAN PIPIT. *Anthus rubescens*. Three seen on Cap Mountain, Aug. 5th, two at Norman, Aug. 14th, several, 15-20. One at Wrigley Harbour, Aug. 31st.

HUDSONIAN CHICKADEE. *Penthestes hudsonicus*. Common back of Two Islands, June 16-28; on Willow Lake River and along Mackenzie River as far north as Wrigley, July 8-Aug. 7.

RUBY-CROWNED KINGLET. *Regulus calendula*. Two seen back of Two Islands, June 2nd.

HERMIT THRUSH. *Hylocichla guttata pallasii*. Characteristic song heard during days and more rarely during evenings along Peace, Slave and Mackenzie Rivers, May 20-July 8. (July 1-8 along Willow Lake River). This is probably the Eastern Hermit thrush.

GRAY-CHEEKED THRUSH. *Hylocichla aliciae*. Notes made by this or the Olive-backed Thrush heard every evening along Peace, Slave and Mackenzie Rivers from May 20-July 18, when two were seen near site of Old Fort Wrigley.

AMERICAN ROBIN. *Planesticus migratorius*. Occasionally seen on Willow Lake River and along Mackenzie River from the Willow to Fort Norman, where it was common Aug. 18th. Heard at Simpson, Aug. 29th.

MOUNTAIN BLUEBIRD. *Sialia currucoides*. An entirely blue bird was seen on the top of the Rocky-by-the-Riverside, Aug. 8th.

MAMMALS.

MOOSE. *Alces americanus*. One yearling seen on Smith Creek* July 26th; numerous tracks in mountains back of Smith Creek. Tracks common in vicinity of Fort Wrigley. Reported common up North Nahanni and Gravel rivers. Indians make boats out of green moose hides on the Liard and Gravel rivers and bring their families and furs out in them. The largest boats require eight skins.

WOOD BISON. *Bison bison athabasca*. Park rangers at Fitzgerald report the buffalo of the Smith reserve to be doing well. An accurate estimate of their number is difficult to make, because of the muskeg and wooded nature of the country. Major McKeand and party reported seeing two bulls in a three-day return trip in July, with pack horses from Fort Smith. The timber wolves are reported to be taking calves.

HUDSON BAY RED SQUIRREL. *Sciurus hudsonicus*. Common throughout the region.

CHESTNUT-CHEEKED VOLE. *Microtus xanthognathus*. One taken on Willow River, July 23rd.

NORTHWEST MUSKRAT. *Ondatra zibethica spatulata*. Common at mouth of Slave River and one seen at Wrigley Harbour.

CANADIAN BEAVER. *Castor canadensis*. Reported fairly common up North Nahanni River in late June. Several seen near mouth of Root River early in July.

MACFARLANE VARYING HARE. *Lepus americanus macfarlani*. Several seen in snares at Fort Fitzgerald, June 1-5. Fairly common in vicinity of Fort Wrigley (New) and 15 miles above, where one (apparently young) was seen in the talons of a Red-tailed Hawk which circled to a considerable height and then started to soar straight for its destination. Common also at Fort Norman. These hares appear to be on the increase.

CANADA LYNX. *Lynx canadensis*. One seen by Dr. Hume's party up North Nahanni river in June.

CONTINENTAL ARCTIC FOX. *Vulpes lagopus innuitus*. A fair number were brought into Fort Norman from the Gravel River and from Great Bear Lake. One was trapped at Fort Norman last winter.

BLACK BEAR. *Ursus americanus*. One seen by our party 50 miles above Fort Norman, Aug. 10th. One seen at Bear Rock, Aug. 12th. Numerous tracks were seen in Franklin Mountains in July.

POLAR BEAR. *Thalarctos maritimus*. A very large skin was brought to Fort Norman from Great Bear Lake, where it was probably obtained from Coronation Gulf Eskimos.

CANADIAN OTTER. *Lutra canadensis*. One reported by Hume's party on North Nahanni during the latter part of June.

WESTERN MINK. *Lutreola vison energumenos*. Reported as rather rare and difficult to trap. One skeleton among martin skeletons at Two Island Indian village.

ALASKA MARTEN. *Mustela americana actuosa*. A fair number taken to Forts Simpson, Wrigley and Norman by trappers. Judging by reports and the skeletons seen at the Indian villages, this is the most numerous fur-bearer in the district. A glimpse of a marten was had by the author in the bush about 10 miles above Fort Wrigley, July 27th.

FISHES.

WHITEFISH. *Coregonus sp.* These were the commonest fish caught by the Indians in the vicinity of Fort Wrigley.

INCONNU. *Stenodus mackenzii*. Very common, up to three feet in length at Wrigley Harbour, June 12th.

*About 12 miles above the present site of Fort Wrigley.

LAKE TROUT. *Cristivomer namaycush*. Two fine specimens nearly 3 feet in length caught by our party at Wrigley Harbour, June 12th.

ARCTIC GRAYLING. *Thymallus singifer*. Two caught at Wrigley Harbour, June 12th. Common

in Smith Creek, 12 miles above Fort Wrigley.

PIKE or JACKFISH. *Esox lucius*. Very common and up to 3 feet in length at Wrigley Harbour, June 12th.

MANITOBA GRASSHOPPERS

BY NORMAN CRIDDLE

(Continued from Vol. XXXVI, No. 3, March, 1922.)

GRASSHOPPERS, as a whole, form an extremely important class of insects. As farm pests they are probably second to none, while indirectly they are an asset which assists greatly in the perpetuation of wild life. To the farmer, they are frequently very obnoxious, to the sportsman beneficial, to the community at large occupying a position that cannot be definitely classified at the present time. It may be useful or harmful, but much more will have to be known about the economic relation between grasshoppers and other animals before accurate information is available on this last point. No one can say truly that the world would be better without grasshoppers, yet the losses they cause each year aggregate millions of dollars.

Nearly all grasshoppers are vegetable feeders, but it does not follow that they are necessarily injurious on that account. Most of them might become so were they to increase sufficiently, but the majority of them never do, and we can, therefore, restrict the truly destructive species to a comparatively small proportion of the total number existing.

In spite of the devastating habits of certain species, grasshoppers, as a whole, play an important part in the scheme of nature; but for them a number of creatures could not exist at all, while many others would be much reduced in numbers. In the insect world there are certain Diptera, Hymenoptera and Coleoptera that live entirely at the grasshopper's expense. These are of a parasitical or predaceous nature. Some of this class devour the eggs, others live within the adult bodies. The egg destroyers are extremely important in reducing locust outbreaks and during the last three years they have done more than any other grasshopper predator to bring the outbreak within bounds. A certain Bee-fly (*Systaechus vulgans*) has been of much value in this respect. The adult is a very hairy yellow fly generally found resting upon flowers, the larva, a much wrinkled inactive grub, met with among the

grasshopper's eggs. Of the Coleoptera, Blister Beetles play an important part in destroying grasshopper eggs. There are various species of this beetle which in the adult stage devour vegetable matter. One (*Macrobasis murina*) is an important pest of potatoes in Western Canada, and here again there is difference of opinion as to whether a species does more harm than good. It cannot, however, exist without grasshopper eggs and for that reason it only becomes a pest during serious grasshopper outbreaks. Another beetle larva (*Percosia obesa*) runs actively about the surface of the ground in search of food and is an expert at locating locust eggs. Having discovered a sac of these it proceeds to make itself at home until it has eaten them. We found a number of these larvae with eggs in their jaws during 1921 and so intent were they upon the feast that they continued to enjoy it even when placed in confinement.

Certain Flesh flies (*Sarcophagidae*) are also valuable grasshopper exterminators. These flies usually attack the adult grasshopper and deposit their maggots while their host is on the wing. Of the wasp-like flies (*Hymenoptera*) a number could be mentioned as grasshopper hunters. Some of these make individual grasshopper eggs their home in which they develop through all their stages. Others carry off their victims bodily and store them in burrows as food for their young. These insect enemies are extremely useful in man's welfare and without their aid grasshoppers would increase beyond all bounds.

Perhaps the greatest benefitters from grasshoppers are birds and I believe it would be easier to enumerate the species that do not eat these insects than to list the ones that do.

In the Middle West, Grouse, such as the Sharp-tail, multiply or decrease in accordance with the number of grasshoppers present, because the rearing of young depends largely upon the available supply of hoppers. The Western Meadow Lark is another bird whose numbers are maintain-

ed through a diet of grasshoppers, and I am of the opinion that without the insect's presence, the country would be deprived to a large extent of one of its most pleasing songsters.

The part played by gulls in reducing grasshopper outbreaks is well known, but the farmers of Manitoba never witnessed so direct an example of this value until the last two years, particularly during the summer of 1921.

In Southwest Manitoba there are two breeding sites for Franklin's Gull, namely Whitewater and Oak Lake. The exact number of breeding birds that nest in these places is unknown to me but I judge there are at least a thousand, possibly far more. At all events the number present in July aggregated fully 10,000.

Franklin's Gull is rapidly becoming recognized as an associate of the farmer and it is essentially a follower of the ploughman. What an inspiring sight it is to see four or five thousand of these birds moving gracefully over the cultivated areas, at times almost brushing the ploughman with their wings, but on all occasions keenly intent upon gathering up the insects driven from cover. Having obtained enough they rest a while upon the fields or perchance move off to some nearby water, but they are soon back again industriously gathering in the harvest of hoppers. So highly are these birds valued that I have known farmers to leave the insect extermination to them alone, rather than to apply the poisoned bait which is known to be effective. Nor did the birds fail to live up to the farmer's expectations.

The Upland Plover is one of the few of its kind that adorn our prairies. It is a beautiful bird and was once quite abundant. Cultivation and persecution have reduced its numbers much, but its habits remain the same. It is still a grasshopper feeder, perhaps more so than any other bird.

Crows are of a type that turn anything to advantage and there is very little that comes amiss to them. Grasshoppers have always formed an important part of their diet, but during the recent outbreak they seem to have become particularly wise to the hopper's habits. It is easy enough for them to pick the insects off stooks of grain or hay cocks, but when it comes to discovering the breeding grounds and digging up the eggs, we must admit that the crow has displayed a wisdom shown by few other birds. That the crow has numerous vices, from our point of view, every one knows, but it has won many friends in Manitoba during the last three years by its grasshopper-devouring habits. Several incipient outbreaks of the insect have been checked by the crow's activities, while in some cases sodded areas heavily impregnated with eggs have been freed of them by these birds.

Nearly all ground-feeding birds devour grasshoppers when chance offers but we cannot possibly enumerate them here. Sufficient to say that in aggregate they must account for enormous numbers of the insects during the summer months.

Mammals are not generally thought of as insect destroyers, but there are several, nevertheless, that relish them as food. Skunks are largely insectivorous and among the insects eaten are numerous grasshoppers. Badgers, weasels, pocket mice, shrews and even the obnoxious gopher all aid in reducing them. Nor should we conclude this list without including certain snakes, toads and frogs.

The dependence of one creature upon another provides a problem that is greatly involved in its ramifications. Let us take for example the case of the crow. When grasshoppers are abundant, these insects unquestionably form a staple diet for the bird, and since this type of food is ample the crow would naturally be less active in its search for birds' eggs and nestlings. For this reason there would be an increase in other birds indirectly due to grasshoppers. To carry this to an extreme it might be pointed out that crows usually destroy numerous rodents such as rabbits and mice, but in grasshopper years less would be taken than when the insects were scarce. This would provide an increase of rodents. The increase of rodents would provide additional food for carnivorous animals such as wolves and lynxes, and, since the smaller game are more easily procured than the large kinds, the result would be the preservation of big game due indirectly to the prevalence of grasshoppers.

I do not wish to infer that grasshoppers are the only factors in providing for a perpetuation of certain wild birds, but they are one of the most important in their season, just as cutworms are to horned larks in early June. Most insects are only present, in numbers, for a limited period of the summer, while grasshoppers are in abundance from June to October. Some, indeed, winter as nymphs and they are therefore among the first insects available for food in spring and the last in autumn.

What would birds do without grasshoppers?

What would grasshoppers do if there were no birds? We leave the reader to answer these questions.

Quite unconscious of the problems its presence involves, our grasshopper pursues the course allotted to it by nature. Of the 25 or more that emerge from a sac of eggs one may die in infancy—dragged off by an ant. Another is attacked by disease, forced up a stem by an uncontrollable impulse, where it dries and bursts into dust, the deadly spores being scattered broadcast upon its

brethren below. Such is *Empusa grilli*. A third may fall a prey to a wasp. A fourth is parasitized, while others fall victims to birds. Thus it is that the original numbers diminish by more than half, yet a single survival producing eggs may double the previous year's output. In other words for every 50 eggs laid some 48 must be accounted for by death before they mature into adults in order to maintain a balance. A tremendous task for nature to provide for. On the other hand, should this balance fall below the figures indicated then there will be a rapid decline in the grasshopper birth rate and a corresponding reduction in such

of their enemies as depend upon them for food. How involved their economic relations are! How unfit are we, with our present knowledge, to judge which one should live or die even to provide for our own benefits!

It may be that in the dim future cultivation will have become intensified and every acre of land be so fully utilized that the old grasshoppers of the plains will have ceased to exist. If that is so then many a bird now prevalent will be rare or extinct. The prospect is not a happy one, and so, in spite of the enormous ravages inflicted, we are inclined to say "long life to the grasshopper."

THE AMERICAN HAWK OWL (*Surnis ulula caparoch*)

BY F. NAPIER SMITH

SATURDAY afternoon, the 22nd May, 1915, I left Montreal for Lochaber, P.Q., to visit the Campbell's Bay Club, a private game club situated on the north shore of the Ottawa River, in Latitude 45° 35', Longitude 75° 18', about 25 miles east of Ottawa, Ont.

I had never visited this district and was anxious to observe its avifauna, having been told by members of the Club that it was a veritable bird-paradise. I noted with pleasure that that abomination, the English Sparrow, was conspicuous by its absence, but I regret I did not discover a single specimen of our beautiful Wood Duck which only two years previously was recorded as breeding in the locality. The only ducks I found nesting were the Black and American Golden-eye (Whistler). Altogether, I recorded 77 species, including such interesting birds as the Scarlet Tanager, Rose Breasted Grosbeak, Great Crested Flycatcher, American Woodcock, Wilson's Snipe and a real 'rara avis,' the American Hawk Owl.

On Sunday morning, at 5.30 a.m., "Old Man" Lussier (the Guardian of the Club) and I started off in a canoe to explore the district by land and water. The 'Bay' is virtually a large lagoon, some 2½ miles in length and varying from 200 yards to a half-mile in width, and affords an excellent feeding and nesting ground for Ducks, Grebes, Rails, Coots, etc. At noon we found ourselves at Frenchman's Point at the western end of the Bay; here the ground was boggy and in some places under water. The trees had long been dead, and in many cases all that remained were hollow trunks or merely stumps. All this decay was due to the undermining action of the water which periodically flooded these woods.

On approaching the shore the first sounds to reach our ears were the guttural calls of the

Bronzed Grackles, and I soon found that this locality was overrun with these birds and field mice. We had left the canoe and were striking into the woods when the Grackle community set up an unusual hubbub. I hurried to the scene of the commotion and was just in time to see a bird make a well-timed swoop to the ground and clutch a young grackle in its unerring talons; another upward swerve and it had perched on an old ten-foot stump with its victim. The noise the grackles now set up was bedlam let loose, but apparently the least concerned of all present was my new acquaintance the Owl (?)—it must surely be an Owl, but why this hunting in broad daylight, and why that long tail? The parents of the unfortunate grackle youngster now yelled furiously and made two or three sallies close to the Owl, who raised his head and snarled at them with a quivering red tongue. This warning somewhat arrested the "closing in" tactics of the grackles, who were finally subdued by Mrs. Owl appearing on the scene (I afterwards concluded that the female was on her eggs, both this and the following day, when I first entered the woods, on each occasion being warned from her nest by the male's cries. I am now convinced that the nest was some distance back and that this was only their hunting-ground; if I had worked on this theory at the time they might have betrayed their nesting site by their actions. On both days the female apparently remained off her eggs for some time while we were in the woods, but as the sun was very hot this can be readily understood.)

To resume our story; the female perched on a branch of a tree close to the stump which the male had chosen and, with feathers ruffled and wings drooped, gave vent to intermittent spasms of peculiar vibrating sounds, more of a 'squeal'

than a 'voice', apparently intended to intimidate her mate. This behaviour elicited an occasional response from the male, who squealed back, however, with a much greater show of composure. I was now within 40 feet of the Owls, but I might have been 40 miles distant for all the notice they took of me. Whatever concern they lacked, however, was amply compensated for by my excitement, for by this time I had guessed who were my newly-found friends.

The next Owl move was made by the 'missus' who took a noiseless dip to the side of her husband on the stump, this being the occasion for further monkey-chattering from both birds. I was getting my camera into play when the male took a fresh grip of the expiring young grackle and flew off through the woods, hoping, presumably, to get rid of wifey. She followed close on his trail, however, both birds squealing back and forth as they flew, while I followed hastily, hoping to locate their nesting site. They did not go far and I soon came up to them again; the male was perched on a high branch of a large birch, the female below him on the same tree. When their chattering had died down the male busied himself with his victim and proceeded leisurely to divest it of its feathers (the meat was evidently being prepared for the baby owls when hatched). I watched this performance through my binoculars for two or three minutes, during which time the female disappeared from the scene, her departure being absolutely noiseless.

As the male Owl was making such a slow job of it I started to canvass the woods with Old Man Lussier in the hopes of locating the female on her nest in the broken-off top of one of the dead trees. We must have spent nearly three hours canvassing truncated trees without discovering a clue, all the time supposing the female to be incubating her eggs. Here's where luck failed me, however, and my cup of joy remained only half-filled, for the nest was never found.

The sun was sinking low when Old Man Lussier and I arrived back at the spot where we had left the canoe. Taking a last look backwards—loathe to leave my new feathered friends even for the night—my eye caught a 12 foot stump in the middle of a small shallow slough. Perched on the top, silently and patiently watching for his prey, was the male Hawk Owl. I pointed him out to Lussier, who remarked in his broken English, "she's get late," thinking no doubt of something more palatable than Owls (we had eaten nothing since breakfast.) I had with me on this trip a small Premo Camera with a film-pack, expecting to obtain nest-and-eggs pictures only; what was now required was a reflecting camera. I decided to try a picture, however, if I could get close

enough, even if I had to tilt the camera considerably. I guessed my first picture at 35 feet; then took a few steps in the water and snapped No. 2 at 25 feet; I became quite excited stalking my game and discovered the camera (?) was shaking a trifle when I snapped No. 3 at about 15 feet; No. 4 was at about 10 feet and still no move on the part of the sphinx! With his yellow eyeballs gazing intently at me I crept a few inches nearer when a whistle from Lussier nearly made me jump; but I refrained from swearing aloud as I was too close to a feathered gentleman in whom I was greatly interested! The next moment the Owl raised his head and gave vent to a few of his peculiar screeches. Was this intended to summon his mate, or what? I looked around to see what Lussier's whistle had meant. He was holding up a field-mouse in his hand and while I watched he knocked over a stump and stamped on some more (nearly every stump in these woods harbored a nest of these rodents). Then I took two or three final steps and came right up to the stump. The owl still intermittently uttered his vibrating cries but showed no signs of departing. Between screeches he would look down at me without expression or sign of fear and I took a picture of him in this pose. For my last attempt I moved around for a side picture to take in the 'hawk' tail. Alas, all these photographs were poorly-timed and distorted! Another whistle from Old Man Lussier and I saw him hold up a field-mouse stuck in the end of a stick which he had cut. This time I understood what he wanted and I told the Owl if he would wait I would get him what he had been hunting for! I splashed over to Lussier and brought back stick and mouse to 'Monsieur Hibou,' as Lussier called him, who resumed his programme of squeals even more persistently than before.

It was here that I took special note of the Hawk Owl's notes. With head thrust forward and mouth wide open, displaying a quivering red tongue—altogether a snarling expression—those weird, vibrating and unmusical sounds beat forth. At this distance of only six feet a certain huskiness was perceptible, the vocal chords sounding as if he had 'yelled himself hoarse,' so to speak, but the screeches were not as strong or penetrating as was suggested by the energy displayed in producing them. The birds nearly always cried as they flew through the woods and at a distance their cries have a somewhat uncanny sound. During all my observations I detected little variation in their cries. They apparently have no other call-notes and no 'hoot.'

Having made these mental notes I tentatively held up stick and mouse to the Owl, at which he stopped squealing and cocked his head from one

side to the other, giving him such a droll appearance that I laughed aloud. On my advancing the mouse to the top of the stump, almost touching him, he opened his beak and gave a slight squeal; for a moment his pupils contracted, the yellow irises appearing enlarged, then, like a flash, he snatched the mouse from the stick with his claw. The next moment he was off with the mouse as buoyant as a feather, squealing as he flew through the woods.

The next day, Monday the 24th May, we were off at about 5.30 a.m. to explore the territory we had not already covered around the Bay. Lusier's son Raoul was with me this time, a young French-Canadian woodsman with a keen love of nature. He was especially eager for the fray this day, being arrayed with my climbing-irons and rifle and his old, trusty weapon, the tomahawk. His eyes shone as he buckled on the climbers and fairly 'ran' twenty feet up a butternut tree to a Sapsucker's nest. He was hardly down when he was up another tree after a Whistler's nest, about thirty feet high this time. I tried to calm his ardor for climbing after this, as I was anxious that he should feel fresh for the Hawk Owls.

At 10.30 a.m. I looked at my notes and found recorded 76 different species, all summer residents. A hypothetical list (chiefly Warblers) would have swelled this number another dozen or so. I had taken some interesting nest pictures but I had one more interesting find to make. We were on our way to the canoe, crossing a piece of open moist pasture, when I heard the peculiar sound-beats characteristic of the flight of the Wilson's Snipe. There he was, circling above us high in the air, a mere speck against the clear blue sky. Luck was with me this time, for in a few moments I almost trod on the female, who jumped off her nest situated in the middle of a small, circular patch of dry ground grown over with high grasses. With her well-known alarm cries of 'scaipe, scaipe,' she trailed along the ground in the well-simulated manner of a wounded bird with broken wing. I obtained good pictures of her nest and four eggs which were about ten days incubated. Then I turned my attention to our friends the Hawk Owls, as the day was advancing rapidly.

At about 11.30 we arrived at Frenchman's Point where the unmusical Grackles were holding forth in chorus, and as we struck into the woods I heard the now-familiar squeal of the Hawk Owl. Sure enough, the male came crying through the woods to greet us, swooping up to a branch to look us over properly. He kept up his screeching until presently the female wafted in silently on the scene. She landed on a low branch of a tree close to the male, but the latter flew away—perhaps he was behind his average 'catch' that

day. The female seemed to take quite an interest in us this time and kept staring at me with head thrust forward. I went closer to her, using different sounds in an attempt to become congenial, whistling, etc! She went through the same 'stunt' as on the previous day with drooping wings and raised feathers, but she seemed to be extremely curious on this occasion, cocking her head sideways (as the male had done) most inquisitively. I happened to have in my hand a round brass specimen box, and Raoul discovered that all her excitement was being caused by the reflections of the sun, which was shining brightly upon the brass box. I immediately "aimed" reflections at her, whereupon she became tremendously excited, drooping her wings and ruffling her feathers beautifully—an interesting sight. Presently the male came calling through the woods and landed on a low stump. He had a field mouse in his talons and was squealing a great deal as if to proclaim his success. The female now started to screech energetically at her mate; just as I was about to attempt a photograph of her she decided to join her husband on the big stump. After increasingly loud antiphony, during which the female again went through her characteristically aggressive movements with raised feathers and half-extended drooping wings, she took her first peck at the mouse in her husband's claw, whereupon he immediately followed suit. My 9X Bush binoculars were 'glued' on them. What a picture! All sense of decorum was swept aside as they proceeded to pull at the unfortunate mouse with their beaks, a regular tug of war, "beaks only"—all other holds barred! The mouse's skin at length gave way in the middle and the female let go, while the male removed a string of entrails with his beak. Now for the camera! Why had I left the Graflex in Montreal? I set the focus of the Premo at 20 feet and was moving up to that distance when the female flew a short distance away, and before I could snap him the male flew away with the mouse, alighting on a high branch of a dead tree. I examined the scene of the late performance and found nothing but some of the mouse's gore and entrails. Then I started to watch the male. The female was with him on the outer end of the same branch and was again going through her peculiar antics, screeching intermittently. While these performances might be characteristic of the Hawk Owl's fighting spirit and well-known courage, I concluded such manoeuvres were also employed simply as "bluff."

I watched the male as he disembowelled the mouse with his beak, holding it with one or both claws and laying out the entrails on the branch with his beak. After a little more 'crowding' and

much squealing on the female's part her busy mate had finished the job and, edging sideways to the trunk of the tree, carefully cached the 'dressed' mouse in the crotch; he then flew to another tree. The birds now appeared restless, and as I wished to make certain of securing them I collected both specimens forthwith with my .22 rifle.

Raoul and I spent another two hours trying to locate the nesting site, bringing the climbing-irons into play on two or three likely-looking trunks, but the nest was never found. Perhaps those gourmands, the Grackles, later commemorated the murder of their natural enemies by feasting on the eggs. Who knows?

That evening I returned to Montreal and on the next day I took my two treasures to Dumouchel Freres, taxidermists, who mounted them, under my direction, in the most characteristic attitude of each as I remembered them, so fresh in my mind.

In dissecting these birds the sexes were determined and the usual fever in the female was found to be well advanced. She had laid her full complement of eggs, which numbered five in this case as far as could be determined. Her abdomen was more or less bare of feathers for a space of about 3 x 5 inches, while in her crop was found a mass of digested animal matter. The male was fully feathered, while in his craw was found a partly digested young Grackle and small portions of field-mice.

The American Hawk Owl (*Surnia ulula caparoch*) is fairly well known as a winter visitor as far South as the northern border of the Eastern States, and I have seen specimens which were shot in the Province of Quebec in the fall of the year, but, as far as can be ascertained, this is the first record of its appearance in these parts as a summer resident, so far out of its regular breeding range.

THE DISAPPEARANCE AND RECOVERY OF THE EASTERN BLUEBIRD

BY P. A. TAVERNER

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ONE of the most interesting episodes, to my mind, in recent American ornithology, has never had the attention called to it that it deserves. I refer to the sudden and almost complete disappearance of the Eastern Bluebird, *Sialia sialis*, in the winter of 1895 and 1896, and its immediate and complete recovery in numbers thereafter.

The Bluebird was one of the commonest and most familiar birds throughout the summer in the northeastern United States and the adjoining parts of Canada. In this region scarcely an orchard but had its Bluebirds. They nested commonly in bird boxes in gardens, old fence posts and similar situations throughout the country and their delicate warble and plaintive notes were the common harbinger of spring as well as the mournful accompaniment to the fleeting autumn. That winter, cold weather swept well down into the southern states and frosts extended well beyond their usual southern geographic limit. It was a winter long remembered by the fruitgrowers of Florida. Reports indicated unusual mortality amongst the more tender species of birds.

It is worthy of note here that though evidence seems to point towards this cold snap having been fatal to most of the Bluebirds in the south,

a few of the species do occasionally survive winters at Point Pelee, Ontario, on the Lake Erie shore, where, even under the mildest winter conditions, they must encounter a more extreme cold than anything experienced during this abnormal season to the south.

The following spring, 1896, I was in Guelph, Ontario. It was practically a Bluebird-less season. Not a single Bluebird was seen. Reports from elsewhere were practically similar, but a few stray individuals were noted where they had previously been abundant. That fall I heard occasional Bluebird warbles as they passed over in migration but saw no birds. The spring of 1897 I was at Toronto when a few birds were noted and from then on their increase was regular and rapid. I should judge that within five years the Bluebirds that had been wiped out to a point approaching extinction had increased again to approximately their old number.

Several important lessons can be drawn from this occurrence: first, the remarkable rapidity with which a common species under certain circumstances and without the interference of man, can be practically exterminated; second, the rapidity with which a depleted but dominant race can reestablish its normal numbers when conditions are propitious; third, the automatically

established limit to the density of population.

By the first, the uncertain and finely adjusted thread upon which some of our species depend for continuance is shown and a possible cause is suggested of the sudden disappearance of such of our birds as the Labrador Duck, Passenger Pigeon, Eskimo Curlew and others for which the human element does not offer an altogether satisfactory explanation.

The recovery of the species from almost nothing to practical normality within half a decade is an indication of how quick and positive is the increase in numbers to be expected from an adaptable race when unfavorable conditions are absent. The Bluebird always suffered somewhat from the small boy and slingshot or flobert rifle combination, the zoologist enthusiast, the collector and, at that date, the millinery trade to some extent. But it shows that in spite of a handicap not amounting to systematic human persecution, a species in harmony with its environment tends to increase rapidly. The converse is also suggested, that species not particularly interfered with by man and yet scarce are so because they lack harmony with their environment and are probably already on the road to natural extinction. We know that species have arisen, flourished and decayed since the beginning and long before man appeared on the scene. Undoubtedly others are undergoing the same process today independently of either the direct or the indirect influence of man. Unless through some fortunate insight into the involved interaction of obscure cause and effect man can control some of the critical destructive factors, most of these species are doomed to ultimate extinction, irrespective of the human attitude. If the Passenger Pigeon had been as well adapted to modern conditions as its near relative, the Mourning Dove, it would not have vanished so suddenly and completely after the last great rookery at Petoskey, Michigan, when all accounts show that there were still hundreds of thousands of birds remaining. The systematic netting and hunting on a large scale ceased with this rookery, and had the birds been fitted to survive there was plenty of stock remaining to have persisted in-

definitely, at least in moderate numbers, notwithstanding occasional, irregular or sporadic shooting.

The third lesson taught by this Bluebird episode is the demonstration that there is a saturation point of population for each species beyond which its numbers may not increase. Bluebirds rose from practically nothing to their normal numbers in a few years *and then they stopped short*. It was a remarkable demonstration of the law of Malthus—that a population tends to increase at a geometrical ratio to the full supporting power of the land. What factor it is that prevents its indefinite increase cannot be guessed at with any likelihood of success. Here was a species increasing regularly and rapidly and then, when a certain density of population was reached, there came, without any apparent change in controlling conditions, a sudden dead stop and an indefinitely continued stationary population. As far as we can see, there was no reason why a growth of numbers should be shown in 1896 and not in 1902. We can only acknowledge that there is a factor of control that prohibits an indefinite increase of population.

The points I wish to make are:—

1. That species may be subject to sudden unexpected factors of extinction that human foresight cannot estimate, guard against or control.
2. That strong dominant species have remarkable resources of recovery from depletion which will come into play if the cards are not stacked against them.
3. That a species unadapted to prevailing conditions is doomed to slow or rapid extinction in spite of all man can do to prevent it.
4. That there is a certain density of population for each species relative to the individuals of that species and to competing forms beyond which, under constant conditions, it is impossible to increase.

All these things should be considered and weighed and given their due importance in such conservation methods as we may put into force.

SUMMER BIRDS OF THE LAC LA BICHE AND FORT McMURRAY REGION

By F. M. FARLEY, CAMROSE, ALBERTA

OF the many portions of western Canada that have received little attention from ornithologists, perhaps none are more outstanding than that country lying between Lac la Biche and Ft. McMurray, at the junction of the Clearwater

and Athabaska rivers. This part of Alberta lies between the 55th and 57th degrees of latitude and the 110th and 112th degrees of longitude, being about eighty miles from east to west and one hundred and forty miles from north to south,

comprising an area as large as the western peninsula of Ontario. I spent the latter part of June and the first two weeks of July, 1919, with a companion, canoeing through the rivers and lakes of this region, and have compiled the appended list of birds observed during the trip.

Lac la Biche is about 150 miles north-east of Edmonton, and is a beautiful lake on the south side of which the Hudson's Bay Company has maintained a post for many years. The lake is about twenty miles by ten miles in extent and has several fair-sized islands which have been the breeding grounds for such birds as the White Pelican, Double-crested Cormorant and Great Blue Heron, likely for ages, but within recent years the natives claim their numbers are not as great as previously.

Around the lake there are many half-breeds who have taken up land, rather more to be used as their headquarters than for farming operations. The soil is generally white clay and sand on the higher lands, with much muskeg in between the ridges. The lake is noted for its large whitefish, many of them weighing over twelve pounds, and a large industry is carried on with the breeds, who net the fish and sell to the companies, who ship them in refrigerator cars to the large cities of the east.

On the north east corner of the lake the Owl River flows in through a beautiful valley, along which are a number of prosperous looking farms. This country is served by the recently constructed Alberta and Great Waterway railroad, which runs from Edmonton to the northern terminus on the Clearwater river, within a few miles of the village of Ft. McMurray.

About 80 miles north of La Biche my partner and I left the train and packed our canoe and outfit over to Christena Lake, less than one mile, from where we were to commence our river and lake journey. This lake is about twelve miles in length by an average of one mile in width; its water is very clear and cold, and from the number of large whitefish that the breeds and Indians were catching, we concluded this was as valuable as the more southern lake for the industry.

The surrounding country was far from being adapted for agriculture in its present state. The ridges are of white clay and yellow sand, partially covered with a poor growth of poplar and jack pine. Between the elevations were large areas of muskeg with scattered willow and tamarack, some of which was large enough to have commercial value. The soil underlying the muskeg moss has the appearance of being very rich in humus, and some day may be drained and should be capable of producing the hardier varieties of grain. Along the bottoms of the Christena

river there were scattered bluffs of good-sized spruce, some measuring nearly three feet at the butt, while the Balm of Gilead was always in evidence and in many places plentiful enough to warrant installation of saw mills. Several large patches of a variety of fern similar to the large ferns in Ontario were found in moist places along the flats.

During our trip through Christena Lake we noticed the scarcity of many ducks, which we thought would be plentiful in this undisturbed country. The general impression has been that all this tremendous region was the summer home of many of the water-fowl, but it was not so, at least as far as the waters over which we travelled were concerned. There were more Mergansers, Buffle Heads and Golden Eyes seen on the river than all other varieties noted during the trip. Some of our common birds were entirely absent, or nearly so; no Meadow Larks or Vesper Sparrows were observed north of La Biche. Ruby-crowned Kinglets, Northern Water-Thrushes and Lincoln's Sparrows were quite common. Every tamarack muskeg resounded with the wonderful three-part song of the Kinglet. On the river we were seldom out of hearing of the Water-Thrush, and whenever a trip was made into the muskegs, Lincoln's Sparrows were heard singing in all directions. This sparrow was the most plentiful bird of the muskeg, where it seemed to be at home in little thickets on any elevation which was not too wet to grow a species of gray willow.

Pine Siskins were very numerous as we neared the Clearwater River, and they could be heard singing from the tops of the highest spruces at any time of the day. No doubt this was their summer home, and it is likely that from localities such as this the large flocks come to us in lower latitudes in the early summer. A couple of Savanna Sparrows were the only ones observed, and they seemed lost on a bit of prairie at the forks of the rivers.

Summer Birds of Lac La Biche and Fort McMurray Regions

1. WESTERN GREBE. Several pairs observed on Christena Lake.
2. RED-NECKED GREBE. Quite a few seen on the larger sloughs.
3. HORNED GREBE. Common in the smaller sloughs.
4. PIED-BILLED GREBE. All the bays in Christena Lake had one or more pairs.
5. GREAT NORTHERN DIVER. Two seen flying from the south towards the lake.
6. AMERICAN HERRING GULL. Many large gulls, thought to be this variety, seen on Lac la Biche.

7. FRANKLIN'S GULL. Either this, or Bonapartes' Gull was quite common; as I did not collect any it was difficult to be positive as to identity.

8. COMMON TERN. Very plentiful at Lac la Biche.

9. BLACK TERN. Occasionally seen around small sloughs.

10. DOUBLE-CRESTED CORMORANT. Fishermen told me they had seen this bird at Lac la Biche the day before our arrival and said they bred commonly on the islands of the lake.

11. AMERICAN WHITE PELICAN. Recorded under the same conditions as the Cormorant.

12. AMERICAN MERGANSER? I saw many males of this species on the river and females were common with their young. Some of these might have been other varieties, probably the Red-breasted Merganser.

13. HOODED MERGANSER. Quite a few males seen daily, and many females with broods a couple of weeks old, which might have belonged to other varieties.

14. MALLARD. Only a few seen. Apparently this is not a favorable locality for this duck.

15. BLUE-WINGED TEAL. Not common.

16. SPOON-BILL. A flock of about twenty seen flying across the Christena River one evening at dusk.

17. AMERICAN GOLDEN EYE. Quite common on river, some with young.

18. BUFFLE HEAD. Not as common as the Golden Eye.

19. WHITE-WINGED SCOTER. Plentiful on both Christena Lake and Lac la Biche.

20. CANADA GOOSE. Fishermen said that numbers of geese bred on the islands of Lac la Biche.

21. AMERICAN BITTERN. Several seen and heard around Christena.

22. GREAT BLUE HERON. Fishermen said these birds nested on islands in Lac la Biche, using the same trees as the cormorants, only nesting higher.

23. SORA RAIL. One seen at Christena Lake.

24. AMERICAN COOT. Plentiful on all lakes.

25. WILSON'S SNIFE. Heard and saw them daily.

26. GREATER YELLOWLEGS. Two seen on the borders of a slough west of the Christena River.

27. LESSER YELLOWLEGS. Quite common in all favorable localities.

28. SOLITARY SANDPIPER. Several pairs seen near sloughs all acting as though they had eggs or young close by.

29. SPOTTED SANDPIPER. Very common along river, several nests found.

30. KILLDEER. Not common.

31. SPRUCE GROUSE. Common in woods close to the river.

32. RUFFED GROUSE. Occasionally seen around our camps.

33. SHARP-TAIL GROUSE. Only one flock seen, said to be very common in the fall on the sand ridges, where they feed on blue-berries which are plentiful through the country.

34. MARSH HAWK. One specimen only seen, a male.

35. RED-TAIL HAWK. Common along the river where several nests were seen containing young, generally high in Balm of Gilead trees.

36. BALD EAGLE. Two seen soaring high over Christena Lake.

37. AMERICAN SPARROW HAWK. Not many observed.

38. AMERICAN OSPREY. One pair seen flying over Christena Lake.

39. SHORT-EARED OWL. Several seen in the low lands around the lake.

40. GREAT HORNED OWL. Quite common, heard every night; likely one of the northern subspecies.

41. BELTED KINGFISHER. Only one observed.

42. NORTHERN HAIRY WOODPECKER. A few seen daily.

43. DOWNY WOODPECKER. More common than the former.

44. YELLOW-BELLIED SAPSUCKER. About the commonest bird seen. They were never out of sight, spending the day catching insects in the air like a Kingbird. They would return to the same perch after each flight.

45. PILEATED WOODPECKER. Heard one hammering on a stub close to Christena Lake. Said to be quite common and was known by everyone we met.

46. NORTHERN FLICKER. Not common.

47. NIGHTHAWK. A few seen every morning and evening.

48. PHOEBE. Not common along the river.

49. WOOD PEWEE. Heard daily in the woods; am not sure as to the geographical form.

50. OLIVE-SIDED FLYCATCHER. A few heard daily.

51. ALDER FLYCATCHER. Fairly common.

52. LEAST FLYCATCHER. Quite common.

53. BLUE JAY. A few heard along the river.

54. CANADA JAY. More common than the former.

55. AMERICAN CROW. Very few seen.

56. COW BIRD. Quite uncommon.

57. RED-WINGED BLACKBIRD. Several large breeding colonies noted.

58. BREWER'S BLACKBIRD? A few Brewer's or Rusties were seen but as none were collected, and as that is possibly the northern limit of Brewer's,

the birds seen might have been Rusties.

59. BRONZED GRACKLE. Common at Lac la Biche, nesting in holes of stubs and old woodpecker nests.

60. HOUSE SPARROW. A flock of about twenty of these birds were quite at home in the village of Ft. McMurray. They had evidently come north in a freight car, and when liberated at the end of steel about fifteen miles from McMurray, spied the cluster of buildings in the distance and were soon in their new home; likely a northern record for these birds.

61. SAVANNA SPARROW. Only one pair heard on some open prairie near McMurray.

62. WHITE-THROATED SPARROW. Quite common in the larger woods along the Clearwater River.

63. CHIPPING SPARROW. One recorded.

64. CLAY-COLORED SPARROW. Not nearly as common as farther south. This sparrow prefers the park-like country to the open prairie or heavy timber country.

65. SLATE-COLORED JUNCO. One of the commonest birds everywhere. A nest with eggs was found under a tie on the railway and as the train only passed to and fro once a week the disturbance did not evidently cause the birds much worry.

66. SONG SPARROW. Not common north of Lac la Biche.

67. LINCOLN'S SPARROW. Next to the Junco and White-throat, this was the most plentiful sparrow. Different times I counted as many as a dozen males singing at one time all within a couple of hundred acres. That country must be the great summer home of this splendid singer.

68. SWAMP SPARROW. A few heard singing their monotonous notes along the edges of marshes.

69. ROSE-BREASTED GROSBEEK. Quite common along the river.

70. CLIFF SWALLOW. Several colonies were nesting along the river.

71. TREE SWALLOW. Not common.

72. BANK SWALLOW. Very common, and nesting in all suitable places. One sand bank had fallen away from the rest of the solid earth and many Swallow's nests with eggs were destroyed. The slide had evidently just taken place as the consternation was great among the birds.

73. RED-EYED VIREO. A few heard daily.

74. WARBLING VIREO. More common than the Red-Eyed.

75. BLACK-AND-WHITE WARBLER. Not very common. Frequencing the tamarack in the muskegs.

76. TENNESSEE WARBLER. A few heard in low places close to the river.

77. YELLOW WARBLER. Not nearly as common as they are farther south.

78. MYRTLE WARBLER. Heard daily in the spruces.

79. OVEN BIRD. A few heard.

80. GRINNELL'S WATER-THRUSH. Quite common all along the rivers and lakes.

81. YELLOW THROAT. A few heard, often in the little clumps of brush in the muskegs.

82. HOUSE WREN. Not many heard.

83. RED-BREASTED NUTHATCH. Only one heard.

84. LONG-TAILED CHICKADEE. Fairly common; this was really Hudsonian territory, but careful watching did not reveal this species.

85. RUBY-CROWNED KINGLET. Common in all tamarack muskegs. Before I located my first one I found that these little birds were ventriloquists of no mean order. When looking for this bird I expected that the singer would be as large as a sparrow, judging by the volume of his voice, and was surprised to find it one of our smallest birds. It is certainly a wonderful singer.

86. WILLOW THRUSH. Fairly common.

87. HERMIT THRUSH. Quite common.

88. ROBIN. Very few seen.

89. MOUNTAIN BLUE-BIRD. Three seen flying over our camp one morning.

BOOK NOTICE

DRU DRURY; an eighteenth century Entomologist.

Professor T. D. A. Cockerell, of the University of Colorado, published an interesting account of the life of the above entomologist in *The Scientific Monthly*, January, 1922.

This is a lengthy article and space here only permits us to make a few extracts from the same. Dru Drury was born February 4, 1725. "He is described as of Wood Street in the Parish of St. Alban, London, citizen and goldsmith; afterwards of the Strand, of Enfield and of Turnham Green,

all in the county of Middlesex and of Broxbourne, Hereford." He died January 15, 1804, and was buried at the Church of St. Martins in the Fields.

"Regarding Drury's life and work as a whole, we have an excellent example of that innate taste or passion for natural history which inspires a certain number of individuals in every generation and which the majority can neither appreciate nor understand. But we are also struck by the fact that favorable circumstances are needed to render such aptitudes fruitful and of benefit to mankind,

Many such men as Drury, all through the ages, have lived and died without leaving any permanent memorials. The favorable circumstances in Drury's case were especially the organization of zoological and botanical knowledge led by Linnæus, combined with the penetration of nearly every part of the world by British commerce. It was possible to come by the materials for greatly enlarging our knowledge of insects and a method had been devised for conveniently recording discoveries. Drury, taking advantage of these conditions, was able to make important and permanent contributions to the science he

loved so much."

Prof. Cockerell in the beginning of his account refers to the correspondence which Drury had with prominent zoologists of his day and to the fact that his letters were copied in a large book. Recently, Prof. Cockerell, while at Funchal, Madeira, was greatly interested to find this letter-book in the possession of Mr. C. O. L. Power, and, borrowing it for a few days, he obtained copies of a number of the more interesting letters and thirty quotations from these appear in the article.

A. G.

REVIEW

The *Auk*, Vol. XXXVIII, 1921, contains the following articles of particular interest to Canadian ornithologists:—

No. 1, January:—

A Nesting of the Philadelphia Vireo. By Harrison Lewis. Pp. 26-44., continued in the succeeding April number on pp. 185-202.

This is an intensive daily account of the nesting of a pair of Philadelphia Vireos, at Bergerville, in the immediate neighborhood of Quebec city, covering the time when the nest was being built, June 12, to when the young left, July 14. Not only does it make another record in the distribution of this rather rare and slightly known Vireo but it is a most excellent demonstration of observation methods in the study of life histories, and shows that whilst the shot-gun may be absolutely necessary in some fields of ornithological investigation there are other valuable lines of work that can be followed bloodlessly. This is nearly a complete field-study of the nesting of this species. The number of American species that this has been accomplished with is pitifully small and is suggestive of the immense amount of work that yet needs to be performed. An important fact to be emphasized in connection with it is that it can be done without special facilities and training other than a certain amount of patience and careful and discriminating observation. Species await the student almost at our back doors.

Further Notes and Observations on the Birds of Hatley, Stanstead County, Quebec, 1919. By H. Mousley. Pp. 51-59.

The paper opens with an introduction describing the special features of the season under discussion and ends with annotations on seven species added to the lists previously published by the author from his locality, bringing them up to 175 species. The most important of these is the Black Rail, an eyesight record but accomplished

with details that go far towards making it convincing. The others are all more or less expected.

Notes on North American Birds, X, By Harry C. Oberholser. Pp. 79-82.

This is a technical paper. Holboell's Grebe is declared to be a subspecies of the European and west Asian *Colymbus griseigena*. It is removed to another genus and called *Pedetaithya greisigena major* (Temminck & Schlegel). Should any of our readers ever see this strange name wandering across a page they may recognize in it our old friend *Colymbus holboelli*. He supports the specific distinctness of the American Bittern from the European bird, and will not follow Hartert's claim that it gives but subspecific rank. He unites the Little Brown and the Sandhill Cranes with only subspecific distinction on the ground that size, the only difference between them, intergraduates. Under this conclusion the Little Brown Crane would become *Grus canadensis mexicana*. Wilson's Snipe he regards as only subspecifically distinct from the Old World Jack Snipe and calls it *Gallinago gallinago delicata*. The present reviewer is not in a position at present writing to question any of these proposals and whether they can stand or not can only be determined by the careful examination of material.

The Geographic Races of *Cyanocitta cristata*. By Harry C. Oberholser. Pp. 83-89.

In this, Mr. Oberholser divides our old friend the Blue Jay into northern and southern races. The type form he restricts to the southern and southeastern States. The northern race, including all Canadian specimens, is named *Cyanocitta cristata bromia*. The differences are those of size, in which extremes overlap, and color. *Bromia* is the larger, less purplish in the blue of the upper parts, and larger white tips to greater coverts, tertials, secondaries and retrices.

In the report of the Thirty-eighth Annual Meeting of the American Ornithologists Union,

held in Washington, Nov. 8-11, we note the names of eight new Canadian Associates.

Under General Notes:—

The Horned Grebe at Hatley, Stanstead County, Quebec. By H. Mousley. P. 108. This species is added to the local list.

The Grasshopper Sparrow in the Montreal District. By L. McI. Terrill. Pp. 115-116. A colony including three singing males is reported from Chambly Co., Que., June 26 and July 5, 1920. Specimens were taken and the record placed on a firm basis. As much cannot be said for an incidental record of the Orchard Oriole seen at Lacolle, on the Richelieu River, seasons of 1916 and 1920. A Towhee seen at Chambly also on the Richelieu is much less remarkable.

Additions to the Birds of Lake County, Minnesota. By Chas. E. Johnson, Pp. 124-126. This is in addition to a list for same locality published in *Auk*, October, 1920. It is interesting to Canadian students as being adjacent to our Rainy River country where no ornithological work has been done, and is suggestive of what may be expected there. It adds seventeen species to the previous list.

Three Important Records from Hatley, Stanstead County, Quebec. By H. Mousley. Pp. 126-127.

This reports a re-occurrence of Bartramian Sandpiper in the locality, adds the Mourning Warbler to the local list, bringing it to 177 species, and announces the breeding of the Yellow-bellied Flycatcher.

Ornithological Notes from Southeastern Alaska. By Geo. Willett. Pp. 127-129. This is interesting to ornithologists on the west coast. It applies mostly to Prince of Wales Island and the Wrangell neighborhood, and consists of annotations on 18 species, including records of Yellow-billed Loon and Pygmy Owl for the vicinity of Wrangell.

Under Notes and News appears an obituary of Professor John Macoun.

No. 2, April:—

The Nesting of the Philadelphia Vireo. By H. F. Lewis. Continued as previously noted.

The History and Purposes of Bird Banding. By Frederick C. Lincoln. Pp. 217-228.

Recent Returns from Trapping and Banding Birds. By S. Prentis Baldwin. Pp. 228-237.

The Marriage Relations of the House Wren. By S. Prentis Baldwin. Pp. 237-244.

These are intensely interesting papers. Mr. Baldwin's work has been mentioned in these reviews before. He developed genealogical tables for his wrens and the involved relationships so brought to light are amusing, if rather irregular according to human standards. This banding

work promises to become one of the most important methods of ornithological investigation.

The English Sparrow and the Motor Vehicle. By W. H. Bertgold, pp. 244-250. This demonstrates the great reduction of the English Sparrow that has taken place in the city of Denver, Colorado, since the more general substitution of motor for horse-drawn vehicles. It substantiates a process of relief that has been noted by other observers.

Sixth Annual List of Proposed Changes in the A.O.U. Check-List of North American Birds. By Harry C. Oberholser. Pp. 264-269. As these are only proposals and have not yet been adopted by the Committee on Nomenclature or affirmed by any considerable body of ornithologists it is necessary to mention only those most important to us. Most of them are purely nomenclatural. W. S. Brooks describes a new species of Canada Jay from Anticosti Island, Gulf of St. Lawrence, under the name of *Perisoreus barbouri* Brooks, *Pro. New Eng. Zool. Club*, VII, March 11, 1920, p. 49. Giving this form full specific status is doubtless due to a disregard of the subspecific conception in total. That the slight isolation of Anticosti should develop a recognizable subspecies is remarkable enough. That it should originate a full species in the present accepted meaning of the term is almost unthinkable. So scanty is the material from this out-of-the-way locality that few if any are able to judge the value of the proposal. The new Cliff Swallow, *Petrochelidon albifrons hypopolia* Oberholser, described in these pages, 1919, and supposed to breed from Montana to Alaska is mentioned. It may be well in this connection to state that the present reviewer has compared a considerable series of this bird and can find no such distinctions as is postulated by the describer. *Thryomanes bewicki arborius* Oberholser. *Wilson Bulletin*, XXXII, March 27, 1920. A new subspecies of Bewick's Wren is proposed for southwestern British Columbia, replacing in part Vigor's Wren, hitherto attributed to that locality.

In General Notes appear the following:—

The Blue Goose in the Province of Quebec. By Harrison F. Lewis. Pp. 270-271. This note records the taking of this rare species at Cap Tourmente, Montmorency Co., P.Q., Oct. 10, 1917, and another Oct. 16, 1920. Both specimens were examined mounted by the recorder. The regular migration of this species seems to be down through Manitoba and the interior. Their occurrences are so irregularly distributed as to suggest that they make their long migrational flight from the east side of James and Hudson Bay to the Gulf of Mexico, the only localities where they are known to occur regularly in num-

bers, in two or three long flights. The occurrence of stragglers from the line of this migration route is a matter of considerable interest. It may be noted that the following paragraph reports the taking of similar specimens in Massachusetts in the falls of 1914 and 1920.

A Late Record of the Red-backed Sandpiper. By Nelson Gowanlock. P. 273. Reports the taking of a specimen of that species near Gimli, Lake Winnipeg, June 27, 1916.

Mortality among Chimney Swifts. By Harrison F. Lewis. Pp. 275-276. Reports, on the authority of Mr. E. C. Allen, the taking of 1175 dead and 100 living Chimney Swifts from a chimney flue of a church in Truro, N.S., in late May (?), 1919. The weather had been very inclement and it appeared that the birds had taken refuge in the chimney, where they were suffocated when the fires were lighted.

An Attack on Live-stock by Magpies. By A. W. Schorger. Pp. 276. This describes the methods by which Magpies in a limited district of Utah enlarged or even originated sores on the backs of sheep and in some cases of cattle until serious damage was done, at least one case ending fatally. This is a most interesting case, paralleling as it does the origination of a similar destructive habit by the Kea Parrots in New Zealand. There have been other cases of this reported against the Magpie in recent literature and probably there will be more said about it in these pages later.

Hooded Warbler on Belle Isle, Detroit. By Etta S. Wilson. P. 281. This substantiates a previous record made by B. H. Swales for this same locality, *Auk*, 1920, p. 463. It seems that Miss Wilson saw what was supposedly the same bird a few hours earlier in the day, May 6, 1920. Belle Isle is within a quarter of a mile of the International Boundary and hence the corroboration of the record is of nearly as much interest to Ontario as to Michigan observers.

Under Recent Literature:—

The Economic Value of the Starling in the United States. By E. R. Kalmbach and I. N. Gabrielson, *U.S. Dept. of Agr., Bulletin* No. 868, pp. 1-66, four plates and several diagrams, is reviewed.

This is a history of the bird's introduction and spread in the United States and a detailed account of its economic possibilities. As the species seems to be extending and headed towards Canada, via southern Ontario, all interested in either the birds or fruit-growing in the threatened districts should obtain copies of this report and shape their reception to the newcomer accordingly. It may be obtained from the Department of Public Documents, Washington, for a few cents.

No. 3, July:—

Which Sex Selects the Nesting Locality. By H. Mousley, Pp. 321-328. This paper is a development and extension of Mr. Mousley's studies of nesting habits previously appearing in the *Auk* under title of 'The Singing Tree and Subsequent Nestings.' It is thoroughly in harmony with Howard's Territory in Bird Life already reviewed in these pages and substantiates much of it. Mr. Mousley decides that amongst the general run of small land birds it is the male that establishes the general neighborhood of the nesting site but the female picks the exact spot. Arriving in spring ahead of the female he selects his summer range and in it a "Singing Tree" from which he can survey his domain, watch for intruders and advertise his presence to passing females, one of which in the normal course of events he accepts as mate. Henceforth until the female locates her nest site the "Singing Tree" acts as a trysting place that holds the pair together; later the nest itself forms the mutual meeting place. In some species, probably those in which both sexes assist in construction, as in the Chickadee, the nest is located by joint agreement between the pair. In the case of the Ruffed Grouse, a polygamous bird, the nest is entirely the care of the female and the sexes go and come independently of each other, but the females are able to find the male whenever necessary by repairing to his drumming log whence his reverberating roll advertises his presence.

Moulds and Bacteria on Egg Collections. By Frederick H. Kennard. Pp. 345-356.

Mr. Kennard for some time has been investigating a destructive mould on eggs in zoological collections. This mould, a tawny bacillus, *Mesentericus fuscus*, flourishes in dry atmosphere and is alarmingly prevalent amongst American collections. His remedy is to wash eggs carefully with Bon-Ami to remove the spots already formed and then immerse, blow holes down, in a solution of mercuric bichloride, 1 to 500; under home conditions, for three to five minutes. The eggs are then washed in running water five to ten minutes according to size and texture. Details of technic are given.

Description of a new Loon. By Louis B. Bishop, M.D. Pp. 264-270. In this the Loons from our prairie provinces westward and the adjoining United States south to northern California are separated from the type form under the name *Gavia immer ellasson* Bishop. It is distinguished by being slightly smaller.

The Mockingbird in the Boston Region and in New England and Canada. By Horace W. Wright. Pp. 382-432. A posthumous paper, for the author died in June, 1920. As is stated in a

note, p. 490, the expense of publication was borne by his sister, Miss Mary Wright. It is a comprehensive and detailed account of the occurrence of the species along the northern border of its range. As far as Canada is concerned most of the old records are cited, Sable Island, that extraordinary sandpit lost in the sea off our east coast where so many unexpected waifs have strayed, Truro, N.S., St. John, N.B., Anticosti Island and Godbout, P.Q. and Strathroy, Chatham, Pt. Pelee and Hamilton, Ont. Most of these casual records are well substantiated but some should probably be re-examined. The paper shows a great amount of research but it is evident that the author was less well acquainted with Canadian literature than he might have been. This may have been due to editing or completion under subsequent hands.

The Name of the Eastern Hermit Thrush. By Outram Bangs and Thomas E. Penard. Pp. 432-434.

It is stated that the subspecific term *pallasi* that has long been applied to the eastern form of the Hermit Thrush was first applied to the type form *guttata* and is therefore a synonym for it. This leaves our eastern bird without a name; that of *faxoni* is proposed, thus making the Hermit Thrush of eastern America *Hylocichla guttata faxoni* Bangs and Penard.

In General Notes appear:—

American Common Tern Recovered in West Africa. By Frederick C. Lincoln. P. 453. A striking example of the value of the banding methods of migration study now being developed. A Common Tern banded July 3, 1913, on Muscongus Bay, Me., by Dr. J. C. Phillips, was taken in August, 1917, on the Niger River Delta in West Africa. It was well known that the Common Tern migrated down both sides of the Atlantic but this evidence that American birds ever pass over to the east side of these vast waters or *vice versa* comes with a considerable shock of surprise. There is evidently more intermixture of New and Old World blood going on than we ever suspected.

King Eider in Michigan Waters. By Etta S. Wilson. Pp. 454-455. Reporting the King Eider through the winter of 1920 and 1921 on the St. Clair River. Also reported from Jack Miner's place near Kingsville, Ont. An unusual number of Snowy Owls were also taken the same season.

Magpies and Live Stock. By T. C. Stephens. Pp. 458-459. Further notes on the attacks on live stock by Magpies, in the Black Hills of North Dakota, and in Nebraska. The indications are that the habit is newly developed and though wide-spread is local and perhaps individual. The evidence shows, however, that the birds in some

cases attack healthy animals (those free from sores or wounds.).

The Black-backed Kamchatkan Wagtail. By John E. Thayer and Outram Bangs. Reports the capture of a specimen on one of the outermost of the Aleutian Islands, May 4, 1913, thus adding the species to the North American list.

The Criterion of the Trinomials. By Jos. Grinnell. In this the writer takes exception to the methods of presentation followed by Mr. Oberholser in his claim of the specific identity of the Sand-hill and Little Brown Cranes. He notes that intergradation in size is exhibited by a large series of measurements but wants to know what those measurements are and to be assured that similar birds were compared and not young, poorly developed Sandhills with adult Little Browns. The point is well taken. We are not prepared to take the say-so of any authority upon an important question without having access to the evidence upon which it is based. He also raises the question of whether in examinations of such character "obvious 'sports,' a runt say" should be disregarded as falling "outside of the polygon of normal variation in the species." He also stresses the necessity of adhering strictly to the intergradation criterion of subspecific status. He deprecates the use of such inferences as that a "form is clearly a Geographic race" and therefore subspecific without intergradation being shown to exist, claiming that species as well as subspecies can originate through geographic influences, a conclusion that seems too obvious to dispute.

Under Recent Literature:—

Mabbot on the Food of Shoal Water Ducks. *Bull.* 862, *U.S. Dept. Agri.*, Dec. 1920, price 25cts. from Supt. Public Documents, Washington. This is a resume of the food habits of Gadwall, Baldpate, Teal, Pintail and Wood Duck. The Mallard and Black Duck were similarly reported on by McAtee in *Bull.* 720, of the same series in 1918.

Lincoln's Instructions in Bird Banding, *U.S. Dept. Agr.*, *Circular* 170, price 5cts. from Dept. Public Documents, Washington. Mr. Lincoln has charge of the bird-banding activities of the Bureau of Biological Survey. This circular consists of instructions in methods and procedure.

Nesting of the American Hawk Owl, *Oologist*, XXXVIII, March 1, 1921. By E. S. Norman of Kalavala, Man. is noted.

A Revision of the Races of *Dendroica auduboni*, *Ohio Journal of Science*, XXI, May, 1921. By H. C. Oberholser. Four races of the species are recognized. It is not apparent from the context which of these he refers to our western provinces.

Under Notes and News occurs a paragraph of peculiar interest to those interested in the minor scientific publications. It appears that even so well established and financed an organ as the *Auk* is feeling the effects of the high cost of and disturbances in the printing industry and it has had to appeal to sources outside its regular subscription list for the sinews of war. It has been glad to receive a financial donation from the National Association of Audubon Societies, and two of the heaviest papers published in the year were at the expense of Miss Mary Wright and Mr. Prentiss Baldwin. Besides this, for the first time within the memory of the reviewer, the *Auk* has appeared three months late. It is catching up now and the January number of the present volume was received towards the end of February. However, it is indicative of the times, prices have soared so that with this Canadian Field-Naturalist we are attempting to publish for \$1.50, numbers that cost us \$3.10. It is evident that this can not continue long. Our subscribers, ignorant of conditions, can hardly be blamed if they think they have a valid cause of complaint against us, but the lowered standard of paper, illustration, mailing and our general lateness of appearance as well as the regrettable doubling up of numbers has been the result of grim necessity. It is at present up to the general naturalist public of Canada whether the attempt to continue a Natural History publication (practically the only one in Canada) is to fail or not. This is not a private venture. No one profits in any financial degree by its success, though numbers of us may be substantially responsible if it fails. It is published entirely as a source of publication and information for Canadian naturalists and for the general good. There is no fault in the present condition of the Canadian Field-Naturalist that funds will not repair. More new subscribers are absolutely essential and in the meantime we plead for consideration from the older ones. It is right up to the naturalists of Canada whether they wish to continue a national source of scientific publication or are satisfied to rely upon the courtesy (always freely extended as far as space permits) of foreign publications.

No. 4, October:—

Breeding Birds of Warland, Lincoln Co., Montana. By Thomas E. Burleigh. Pp. 552-565. An annotated list of summer birds from a point on the Kootenai River very close to the Southern British Columbia Boundary. It is of suggestive interest to workers in that section.

Under General Notes occur:—

Double-crested Cormorant in Ontario. By

M. J. Magee, p. 597. The occurrence of six birds Aug. 4 to 21, 1921, near Gargantua, Ont., near eastern end of Lake Superior.

Note on the Breeding of the Semipalmated Plover in Nova Scotia. By Chas. W. Townsend, M.D. P. 601. Refers to Lewis' report of eggs in Yarmouth Co. and his own record of downy young at Seal Island previously published. Adds a record of birds playing wounded as if with young on shore of Barrington Bay near Coffinrock, N.S., July 1, 1921.

Evening Grosbeak in Michigan. By M. J. Magee. P. 604. Reports birds summering at Hulbert, Mich., some forty miles west of Sault Ste. Marie. Also occurrence of adults and immatures scarcely able to fly, Aug. 24, at Sault Ste. Marie, Mich. It seems that at last we are running down the nesting grounds of this mysterious species.

Goldfinches and Purple Finches Wintering at Hatley, Stanstead County, Quebec. By H. Mousley. P. 606. The title suggests the general tenor of this note but the author calls attention to a little known or unusual taste for salt noted in some birds, Purple Finch, House Sparrow, Mourning Dove and Crow.

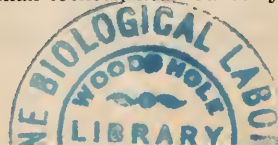
The Philadelphia Vireo in the Province of Quebec. By H. Mousley. P. 607. Calling Mr. Lewis' attention to overlooked records made by himself. It may be said parenthetically here that these records were published after the above manuscript had been prepared and was beyond the writer's control.

Golden-winged Warbler at Sault Ste. Marie, Mich. By M. J. Magee. P. 607. A sight record of this species near the above place. It is certainly a northern record, too far north to be accepted as it stands and without further details.

Early Spring Records at Hatley, Stanstead County, Que. By H. Mousley. P. 609. A number of unusually early spring records for the locality.

Early Bird Banding. By Ernest Thompson Seton. P. 611. Description of early attempts by writer in marking birds with ink spots and small lockets, near Carberry, from 1882 to 1884.

P. A. T.





DENIZENS OF THE HEIGHTS—ROCKY MOUNTAIN GOATS

Courtesy of Canadian National Parks Branch, Department of the Interior

Photo Byron Harnon



The Canadian Field-Naturalist

VOL. XXXVI

OTTAWA, ONT., MAY, 1922

No. 5

ADVENTURES WITH THE CANADA GOOSE

BY P. A. TAVERNER

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OUR old friend, Jack Miner, of Canada Goose fame, professes unbounded admiration for the moral and mental excellencies of the Canada Goose. While his superlatives in this connection may have a flavor of the exaggeration of enthusiasm, it is not at all certain that Jack does not understand goose nature better than do some of us Doubting Thomas skeptics. Certainly Canada Geese make model spouses and most devoted parents. A drake mates only for the occasion, and enjoys a sensuous honeymoon, but refuses the further responsibilities of his actions, and leads a care-free existence with other gay bachelors and grass widowers in stag-parties on the open lakes and marshes while his conscientious duck alone shoulders the drab, exacting duties of raising the brood to maturity. Quite otherwise is it with the gander of *Branta canadensis*; he mates for life, standing watch and ward over mate, eggs and young, co-operates in protection, unites in self-sacrifice and holds to his mate till death doth them part. Some of the following experiences go a way in substantiating Mr. Miner's oft-expressed opinions.

It was on Cypress Lake, Saskatchewan, in the summer of 1921. We were in a rowboat with an outboard motor when we saw a family of geese, the pair of adults and four downy young but a few days from the egg, on the lake ahead. When they became aware that our progress was carrying us uncomfortably near, they edged towards the shore, slowly and openly at first, apparently not appreciating the unusual swiftness of our approach. Then they put on more speed, and arranged themselves in a long single file, one parent leading, the other bringing up the rear, swimming low, and both with their long necks outstretched and laid down flat on the water, making themselves as inconspicuous as possible. The young, coaxed from ahead and urged from behind, paddled along vigorously between, one

close behind the other. From our low and distant point of view, the effect was interesting. They looked like a floating stick. Certainly they would not impress the casual eye as a family of Canada Geese and if we had not first seen them in a more characteristic pose they would undoubtedly have been passed without recognition. If our speed had been derived from oars or paddles, it would have taken a considerable chase to have caught them, but the engine gave us an unfair advantage and one they had not counted on, for in a moment we were upon them.

We tried desperately to get the graflex to bear upon them whilst they were in this peculiar lock-step formation. But even a long focus lens demands close quarters to make an appreciable image of even so large a bird as a goose and just before we were ready to take the shot the birds realized that concealment had failed and that other tactics were necessary. The parents raised their heads and, flapping their wings, endeavoured to get a higher burst of speed out of their charges. Failing in this, the gander,* calling loudly and excitedly, splashed off ahead for a few yards, looked back to see that the goslings could not follow, and flapped helplessly on over the water. The goose hesitated a moment and then joined her mate whilst the youngsters, still little more than fluffy balls of down, bunched irresolutely and then one and all dove and disappeared from sight. During the next few minutes the old birds scurried back and forth over the water in our immediate vicinity, playing the old familiar broken-wing deceit to decoy us away, occasionally rising and flying a few hundred yards, only to circle back to renew the attempts to coax us off, all the time honking loudly in a high shrill key that revealed the agony of their

*As I have no means of determining the sex of the parent birds, it is assumed for the purposes of this story that the gander led.

anxiety. Meanwhile the little ones bobbed to the surface in a scattered bunch like a handful of yellow corks, saw us and ducked again, came up more scattered still and disappeared immediately. They rapidly became more expert in their bobbing and diving and soon indicated their rising only by an instantaneous glimpse of a dull yellow spot in a swirl of cloudy water. The camera was confusedly pointed this way and that, but so quick were the subjects that no snap could be made, and all the while they kept scattering and getting farther apart until finally we were

The brood formed in line in the same manner as before, but instead of rushing in at full speed, we slowly edged them in towards shore. Here there was a narrow, sandy mud wash at the foot of a steep embankment some twelve inches high. On top of this was a dry flat, covered with scanty grass and sage clumps, rising gradually at first, then more steeply, to a bare hill a hundred yards back. They gradually worked in to this shore. On being pushed a little too hard, the goose again splashed off. Seeing that a repetition of the former fruitless tactics was about to follow, we



"We . . . let the gander herd his charges shorewards"

left, with a virgin camera, vainly waiting the reappearance of the last gosling seen, and there was nothing but empty lake before us with a pair of anxious parent geese still endeavouring to decoy us away—but from a safer distance and with considerably less recklessness. We withdrew rather crestfallen, but before we lost sight of them we could see that the little family was reunited and making for the grassy marsh where there was cover for young geese and safety from motor boats.

This was interesting of course as a demonstration of the ability of the young to scatter and hide on the open lake, but, except for the first line-formation with the long conspicuous parental necks prone on the water, not different from the actions of any of the ducks under similar circumstances.

Foiled in obtaining photographs this time, when we discovered another similar family a few minutes later, we resorted to more cautious tactics.

paused and let the gander herd his charges shorewards. They landed and climbed the bank, the gander leading, erect to his fullest extent and honking loudly, calling to us to follow. The brood came close after him. In the meantime, the goose, which had first left towards the right, had desisted from her exertions to lead us in that direction and had circled about us, and now appeared approaching the shore at our right where she also landed and occasionally answered her mate. The youngsters, toddling after the gander, at the first short grassy cover suddenly changed their course at right angles and with it their mode of travel. Hitherto openly intent only on speed, without any attempt to hide, now with heads low and sinuous movement, they moused through the scanty herbage, taking advantage of every little grassy clump, and so just could be seen, glinting through the dull shadows in the sere yellow background. They followed parallel

to the shore until opposite the waiting goose and then came out to where she waited to receive them and they all took to water again and paddled off quietly and inconspicuously whilst the loud-calling gander on the bare hill-side watched the results of the ruse anxiously and continued his conspicuous demonstrations to keep our attention on him. The whole little comedy was admirably worked out, obviously on the spur of the moment, and I doubt if, given the same conditions, human intelligence could have evolved a better ruse for the safety of the little family.

It was notable that, though several times afterward we cruised this part of the lake, and knew that these geese families were still present, we never had such an opportunity again. It is my experience that birds learn much by one lesson. Opportunities for successful photographing occur unexpectedly with certain birds once only. If they are not taken advantage of then, the chance is unlikely to be repeated. Birds with a nest are sometimes badly flustered when surprised, and if one is prepared to take advantage of the circumstance, good pictures may be obtained—but one must work quickly and immediately. The first swoops of the parent hawk are usually the closest and most daring, and on a return visit of the intruder more wary tactics are generally pursued. At any rate all we saw of these geese again was the stick-like line disappearing in the reedy cover far in advance of us and doubtless the first sound of our *put-put* in the distance was the signal for them to forsake the open water and make for cover. We had caught them in the open once, but they did not permit us to do so again. There on the lake where heretofore open water was salvation against all danger, they had learned at one lesson its futility against our speed and power and had reorganized their whole system of protection.

A letter recently received from Mr. H. A. P. Smith of Digby, Nova Scotia, contains so much of interest in this connection, and an account of some habits of the species that but rarely find their way into our text books and life histories, that I asked the writer's permission to publish it. The following is but a slightly edited copy of his account.

"I certainly believe that the Canada Goose is the wisest of game birds. For a number of years I bred wild geese on a friend's farm at the head of St. Mary's Bay. These were virtually wild. They were allowed their liberty and flew about over the big salt marshes as they liked during the months of the close season for wild fowl. I found that the birds did not mate until they were

four years old. I took great pleasure with the geese and used them for decoys. My regular 'shooting team' became very tame and I firmly believe that they knew their names.

"On one occasion when I was shooting geese at Barrington Bay in January, I was surprised by a large flock of geese coming to water. Canada Geese must have fresh water at least once a day. I was waiting near where a spring of water trickled down from the rocky cliff where the geese came at high tide at night for water. Several evenings I waited here for the birds to come in with the tide for water. It was very dark but I could hear the big flock out in the bay some 150 yards out having a great time. Occasionally they would quiet for a few minutes and then again all honk and talk together. Some two weeks afterwards I was at the same place waiting in the moonlight, and the geese were off shore again making the usual fuss. Suddenly they quieted and I noticed a bunch of birds which I took to be Black Ducks swimming in to the water hole. They came, drank, and disappeared again like shadows, perfectly noiselessly. After they had disappeared in the direction of the geese that had been talking there was a great honking again. This was repeated again very soon and I saw another bunch of birds swim in and drink and all was quiet until they had rejoined the flock when the usual racket took place. I decided that if any more Black Ducks swam in I would shoot at them. Presently they came, silent as death except for the gurgling of water and the rattle of pebbles as they drank. I shot and killed five geese.

"Now, the question was, why did the geese act in this manner? I sat in camp and tried to reason it out. At last I came to the conclusion that the birds made the noise off shore to hide the others coming in and to advertise the fact that they were not near shore. When the incoming bunch drew near the danger point, the others quieted so that those near the drinking place could hear any movement on shore and retire on evidence of attack from the bushes. An enemy passing or listening for them would think they were off in the bay and out of range. No doubt more than one gunner has listened to the geese and wished that they would come in closer under similar circumstances. A friend of mine says that if a Black Duck had a neck as long as a goose's it would be the hardest of our game birds to approach, but I incline to the belief that the Canada Goose, in a district where it has been hunted, is the wisest bird that flies."

THE DISTRIBUTION OF THE OTTAWA TRENTON ECHINODERM FAUNAS

BY A. F. FOERSTE

THE Trenton limestone of the Ottawa area is characterized by an interesting fauna, part of which is very restricted in its geographical distribution. This is true especially of its echinoderms, including the cystids, crinoids, and starfish, which are represented by a considerable variety of species, some of which are fairly common. The same species as those found at Ottawa, or closely related forms, occur also 170 miles south west of Ottawa, at Kirkfield, on the Trent canal, between Simcoe and Balsam Lakes. These two localities, Ottawa and Kirkfield, are widely known for the richness of their Trenton echinoderm faunas. A small exposure on Goat Island, northeast of Little Current, on Manitoulin Island, 300 miles almost directly west of Ottawa, has furnished a small echinoderm fauna of such variety that it is probable that if considerable exposures were at hand, the number of species here also would be considerable. This Goat Island fauna evidently is closely related to that found in the Trenton at Ottawa. Farther westward the Trenton echinoderm fauna of the Ottawa area is represented only by occasional species.

Six hundred miles west of Ottawa, on the Escanaba River, northwest of Green Bay, an arm of Lake Michigan, in section 17 of township 41 of range 23, the very characteristic Ottawa species, *Comarocystites punctatus* Billings, occurs associated with the widely distributed species *Pasceolus globosus* Billings, and with the New York Trenton species, *Schizocrinus nodosus* Hall. About 10 or 20 feet farther up, another New York Trenton species, *Cheirocrinus anatiformis* (Hall), is found. These species were collected long ago by Dr. Carl Rominger, at that time State Geologist of Michigan (Geological Survey of Michigan, Vol. I, 1873, pp. 58-60). Recently the writer had an opportunity of examining the original specimens of *Comarocystites* and *Pasceolus* collected by Rominger, and now deposited in the Geological Museum belonging to the University of Michigan. The *Comarocystites* specimen, numbered 5405, evidently is a typical representative of the species *C. punctatus*, as recognized already by Rominger.

The specimen of *Pasceolus*, numbered 5403, however, was described by Rominger in the following paragraph which leaves its identity unestablished:

"BRYOZOA.—*Chaetetes petropolitanus*, *Chaetetes ramosus*, and several other forms, of which one

is interesting enough to be described here. It is of small mummiform shape, with conspicuous solid dots, formed by closed tubes and closed finer interstitial cells. These solid dots in some specimens project like warts, and are surrounded by a depressed polygonal area, which gives the surface a striking similarity with a compound star-coral. Perfectly identical specimens also occur in the Trenton limestone of Canada, near Ottawa river, and are preserved in the collections of the Geological Survey at Montreal."

The preceding description becomes readily intelligible, when compared with the specimen belonging at present to the University of Michigan. The latter is depressed globose in form, 33 mm. in diameter, and 22 mm. in height. It is covered with numerous hexagonal and pentagonal plates averaging from 3 to 3.5 mm. in diameter. The sutures between these plates are clearly defined. The central part of the plates is depressed, and from this depressed area grooves radiate outward in a stellate manner toward the angles of the plates, usually disappearing before reaching the latter. It is these stellate grooves which suggested to Rominger a striking similarity with a compound star-coral. All specimens of *Pasceolus globosus* do not show these stellate grooves. In some specimens the plates present moderately convex surfaces, suggesting to Rominger solid dots, projecting like warts. The appearance of warts projecting from the general mass is due to weathering, which has left narrow grooves between some of the plates. There are no interstitial cells; Rominger was deceived by irregularities along some of the sutures. A break across one of the plates, parallel to its surface, shows that what appear as sutures at the surface are in reality vertical walls, very thin, which can be traced for a distance of 1 mm. beneath the surface, but no other structure can be observed in the interior of the Escanaba specimen.

At present there is a tendency to regard *Pasceolus* as one of the calcareous algæ in which a central space is surrounded by a single spherical layer of cells completely shutting off the interior cavity. The cells present polygonal outlines due to lateral pressure. The walls separating the cells are very thin. The outer walls, facing the exterior, are either concave and with stellate grooves, or convex and without any other con-

spicuous markings. The inner walls are convex toward the interior, and, in certain species, present a short central spine projecting toward the center of the cavity. In the Escanaba specimen the inner walls do not appear to be preserved.

It is possible that two genera occur among the species formerly referred to *Pasceolus*. Bassler refers the two species from the Gun River member of the Anticostian series of strata, *Pasceolus gregarius* Billings and *Pasceolus intermedius* Billings, to the genus *Nidulites*; however, the reason for this association is not stated.

The Escanaba specimen of *Comarocystites punctatus* Billings retains 22 complete thecal plates. Among these is the plate bordering the anal opening on the right, and the one bordering it on the left is almost entire but has been crowded against the former. A part of the basal support of the pair of brachioles nearest the anal opening is present; and a trace of the basal support of the second pair of brachioles, more distant from the anal opening, may be detected. Below the level of these basal supports for the brachioles the thecal plates best preserved are arranged in 5 transverse rows, with indications of 2 rows beneath. Evidently two or three additional transverse rows of plates must have intervened between the lowest part of the specimen and the top of the column. Along the level of the anal opening and just beneath the latter, the number of thecal plates in the transverse rows is 6 or 7, indicating that nearly the entire width of the theca is presented, but pressed flat previous to fossilization. In this flattened condition 6 plates form a width of 35 mm. The plates are of the same size as in typical *Comarocystites punctatus*, and present the same degree of concavity, but apparently are much thinner than in most specimens found at Ottawa. The plates are built up of vertical lamellæ occupying triangular fields whose apices meet at the centers of the plates, and whose bases are formed in each field by one of the sutures between adjacent plates. About 10 of these vertical lamellæ, parallel within the same field, occupy a width of 3 mm. The pores between the lamellæ tend to be arranged in transverse rows, but with numerous irregularities. Several of the plates preserve some of the pustulose elevations noted on the exterior surface of the thecal plates of typical specimens of this species (*Ottawa Naturalist*, 30, 1916, pl. 2, figs. 1A, 1B, and 1D.).

Aside from the occurrence of the typical species at Ottawa and on the Escanaba river, *Comarocystites* is known only from the Kimmswick member of the Black River formation at Cape Girardeau, Missouri, and at West Kimmswick in the same state, where it is represented by *Comarocystites shumardi* Meek and Worthen.

Pasceolus globosus, on the contrary, is more widely distributed. It is listed by Ulrich from the lower or *Clitambonites* member of the Prosser formation in the Minnesota area (Geol. Survey Minnesota, III, pt. 2, page cxxiii); and it occurs in the upper of *Cynthiana* member of the Trenton near Ivor, east of Cincinnati, Ohio, although the latter horizon is much higher than any part of the Trenton in the Ottawa area.

Among the genera known at present in the Trenton only from Ottawa and Kirkfield in southern Ontario are *Astrocystites*, *Atelocystites*, *Glyptocystites*, *Ottawacrinus*, *Palæocrinus*, *Periglyptocrinus*, *Petraster*, and *Protaxocrinus*. Of these *Palæocrinus* is known as far east as Montreal during the Chazyan, but not during the Trenton.

Among genera known in the Trenton of Canada only from Ottawa and Kirkfield, but occurring also in the Curdsville member at the base of the Trenton in Kentucky, are *Amygdalocystites*, *Cleioocrinus*, *Edriaster*, *Glyptocrinus*, *Hybocrinus*, *Hybocystites*, *Lebetodiscus*, *Releoocrinus*, and *Stenaster*. Among these, *Cleioocrinus* occurs in the Chazyan of Lake Champlain and of western Tennessee, and *Hybocrinus* occurs in the Chazyan of Montreal. *Edriaster* ranges in the Trenton as far west as the Minnesota area, where it is listed by Ulrich from the Prosser member. *Poroocrinus* occurs not only at Ottawa, Kirkfield, and Belleville in southern Ontario, but also in the Platteville member of the Black River formation in Illinois, and in the Trenton of Frobisher Bay, in Baffin Land, in Arctic America. *Hemicystites* occurs at Peterboro, but in Kentucky it is known only in the upper or *Cynthiana* member of the Trenton, above the Trenton of the Ottawa area.

Among the genera occurring not only at Ottawa, Kirkfield, and in central Kentucky, but also as far east of Ottawa as Montreal are *Cupulocrinus*, *Dendrocrinus*, *Ectenocrinus*, *Hudsonaster*, *Pleurocystites*, and *Tæniaster*, the last mentioned genus occurring near the city of Quebec. *Archæocrinus* and *Cheirocrinus* are known from as far east as Montreal, but are not listed from Kentucky. Of these genera *Cupulocrinus*, *Dendrocrinus*, *Hudsonaster*, *Pleurocystites*, *Tæniaster*, and *Cheirocrinus* are known also in the Trenton of New York, while *Hudsonaster* ranges as far west as Minnesota.

Cyclocystoides is not known at Montreal, but occurs at Lake St. John, in northern Quebec, and the type of *Cyclocystoides anteceptus* Hall was obtained on the Escanaba River in the northern Peninsula of Michigan. The genus is known also from New York.

Among the genera known from Ottawa and Kirkfield, and also in New York, are *Carabocrinus*, *Cremacrinus*, and *Urasterella*. The first two of

these occur also in the Trenton of Kentucky, and the last ranges as far west as Minnesota.

From the preceding notes it is evident that during Trenton times the Ottawa echinoderm fauna ranged as far east as Montreal, as far west as Minnesota, and as far south as New York and central Kentucky.

In the Ottawa are, however, there are three echinoderm horizons. Of these the lowest horizon forms the lower third of the Hull member, about 35 feet above the base of the Trenton formation. The second horizon occurs 160 feet above the base of the Trenton, a short distance above the lower quarter of the *Prasopora* member, which is regarded as corresponding best to the typical Trenton of New York. The third zone occurs about 235 feet above the base of the Trenton, in the lower part of the Picton member. Of these three horizons the lower and middle ones are of special interest in this connection because they contain the largest and most varied of the echinoderm faunas.

The lower or Hull horizon is stated by Prof. Raymond (Bul. Mus. Comparative Zoology, vol. 56, No. 3, 1916, p. 260) to be well exposed at Kirkfield, and to be very near the horizon of the Curdsville member of the Trenton in central Kentucky. The exposures in eastern New York and at Montreal which contain *Pleurocystites*, and which belong to the Glens Falls member at the base of the Trenton, are regarded by him to be probably of about the same age as the Hull beds.

The middle or *Prasopora* horizon is that part of the Trenton best exposed at Trenton Falls, the type section of the Trenton in New York. It is characterized by the presence of *Clitambonites*.

The upper or Picton horizon is characterized by the presence of *Strophomena trilobita*, *Rafinesquina deltoidea*, and *Cyclospira bisulcata*, and, according to Prof. Raymond, probably is the horizon with which the Minnesota cystid bed, in the upper part of the Prosser formation, is to be correlated.

Apparently the Ottawa echinoderm fauna extended farthest south and east during the deposition of the lowest or Hull horizon. During the deposition of the middle or *Prasopora* horizon strata it apparently did not reach Montreal on the east, nor extend far beyond north-central New York in a southward direction. Possibly the

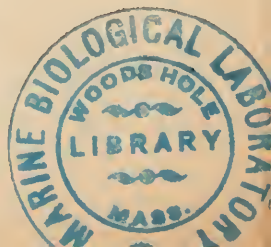
exposures along the Escanaba River in northern Michigan belong here. During the deposition of the upper or Picton strata the Ottawa echinoderm fauna apparently reached the Minnesota area. Finally, during the deposition of the lower Maquoketa there appears to have been a reinvasion of the Ottawa Trenton echinoderm fauna from some unknown northern area to which it had retreated during the long period intervening between the close of the Trenton and the beginning of the Maquoketa.

During early Trenton times southern Ontario, including Ottawa and Kirkfield, appears to have been a center of distribution from which the Ottawa echinoderm fauna radiated in different directions.

Fore-runners of this fauna appear already in the Chazyan of southern Quebec, of the Lake Champlain area of New York, and in various parts of Tennessee. It remains to be determined from what areas this echinoderm fauna invaded southern Ontario in early Trenton times, but present information suggests at least that later, during the Trenton and subsequent to the Trenton, this fauna was largely of northern distribution.

A few of these genera are known also from European strata but these do not indicate the origin of the Ottawa echinoderm fauna from European sources. The presence of *Cheirocrinus* in Great Britain and in the northwestern part of the continent of Europe, including the Baltic provinces, is indicative rather of the northern distribution of this genus, since the Chazyan species found in America appear to be as old as anything found in Europe. In a similar manner, the occurrence of *Pleurocystites* in Ireland, Wales, and the Girvan district of Scotland, and the failure of its appearance on the continent, suggests the origin of the British species from American sources, rather than the reverse, the American species from the Ottawa area being regarded by Dr. Bather as distinctly older (Trans. Royal Soc Edinburgh, 49, pt. II, 1913, p. 460).

It is not unlikely that the greater part of the Ottawa echinoderm fauna is distinctly of American origin, though the data are not yet at hand to determine its sources. More detailed knowledge of American Chazyan echinoderm faunas is necessary to trace the origin of the Ottawa faunas one step backward.



WOOD RATS AND GRIZZLY BEARS

BY MERLE F. BANCROFT

MANY examples of the instinct in wild animals to shield their young from enemies may be seen in tramping through the mountains of southeastern British Columbia. The writer, accompanied by a prospector and an engineer, saw two such examples on the morning of July 29th, 1920. The first was on the part of a mother wood rat dwelling in an abandoned mine and the second was in the case of a huge grizzly bear, concerned about the safety of her offspring.

We, three men, had set out from Ferguson with the intention of making a wide circuit through part of the Selkirk Mountains lying between Lardeau Creek and the Duncan River. The first day we lunched at "Circle City," a one cabin stopping-place in the timbered valley of Ferguson Creek. The trail from Circle City to the Old Gold mine on the Duncan slope proved to be an excellent one for gaining elevation. There was considerable snow on the pass and the trail on the Duncan side lay across several wide gulches full of hard packed snow. The construction of this trail is unique, as it rises from near the pass to skirt around a deep rocky basin; for a mile the trail is nothing more than a rock shelf cut high up on a limestone bluff. As we ascended from the rock shelf, a mountain goat cantered ahead of us across some snow and was soon climbing to safety among the cliffs. Before reaching the Old Gold cabin, located on the crest of a short ridge, we paused to bag a whistler or marmot. We were successful in this. The hoary marmot goes well in a shepherd's pie and is one of the popular fresh meat diets of the Indians in British Columbia.

In the valley that lay to the north below us the wild animals were fortunate enough to know little of man and his doings. There were a number of gophers around the cabin to welcome us. Prospectors working at the Old Gold mine had made friends with these animals, called them by name and fed them scraps of food. In some respects these little creatures showed no more fear than gray squirrels that frequent parks and climb over people in search of food.

Later in the evening porcupine and wood rats furnished a different sort of diversion. Their nocturnal activities jeopardized the chances for our much-needed rest. Wood rats have a reputation for being troublesome at night and the most effective method of getting deadly revenge is to strike a light and deal suddenly with the pests. A very peculiar unpleasant odour is characteristic of the wood rat.

In the West the bushy-tailed wood rat is abundant and known by different names, such as "mountain rat," "trade rat," "pack rat," "bush rat" and other less modest terms descriptive of their habits and character. Probably no other animal has furnished better target practice for indoor shooting where interior decorations are given no serious thought and "dead rats" are the objective.

One night while sleeping under the stars far from any cabin I was aroused by my companion exclaiming, "Do you smell a wood rat?" The scent of the little beast was fresh and strong and in the half dark we began to feel around to locate our visitor. There were two thicknesses of blanket between us and the ground. Shrill squeaks and squeals came from a part of the blanket that lay between us as we grabbed a suspicious looking fold. The wood rat had chosen a good place to share in our bodily warmth, though that may not have been his intention. He had taken up a position in the blankets almost beneath my companion's nose.

On another occasion our temporary quarters were in an old mill on the South Thompson River not far from Ashcroft. Wood rats were noisy throughout the night. I was sleeping on a camp cot and in the gray dawn heard a rapid beating on the board floor beneath my cot. Quickly ducking my head over the side of the cot, I got my first close-up glimpse of a wood-rat. He was sitting on his haunches and his long bushy tail lay flat on the floor. The noise had ceased, the rat had escaped and I could only guess how that noise had been made. Had the rat been slapping his tail on the floor? The tail looked too light to produce the noise I had heard. I later learned that wood rats "express annoyance or alarm by a rapid drumming on the ground with their hind feet, just as is done by some of the hares and rabbits." This particular wood rat had become adept in drumming on a board floor. The noise produced was far louder than ground drumming.

To return to the events of July 29th, 1920, we three men got an early start, descending from the Old Gold cabin into the mountain basin below. We stopped at the Guinea Gold mine to look over the underground mining developments on this property. There was every sign that wood rats had taken up their abode in the blacksmith shop and in tunnels. "They are prolific animals and each year have several litters containing from two to five." This mine had been infested by the

wood rats for some years, as indicated by the piles of sticks and trash. "Sometimes these piles of fragments seem to be made merely for amusement or to work off surplus energy, for they form useless gatherings of sticks and other materials, scattered aimlessly about the wood rats' haunts."

There are two tunnels on the Guinea Gold, connected by an eighty-five foot vertical upraise. Thirty feet below the upper tunnel an intermediate tunnel had been driven from the upraise. There was considerable water near the entrance of the lower tunnel and no wood rats enter water voluntarily. The popular point of access to the mine for wood rats was plainly by the upper tunnel. This tunnel was bone dry and the floor was almost covered with sticks, leaves and materials packed in by the wood rats. Daylight penetrated gloomily into the tunnel for some distance over old abandoned nests. Eighty-five feet in from the entrance of the tunnel the upraise from the lower tunnel came through and since it was reported that some silver-lead ore might be seen in the intermediate cross-cut, we cautiously descended to investigate.

The atmosphere in the mine was decidedly ratty and we had already had audible evidence that we had startled some of the rat tribe in coming through the upper tunnel. We were surprised to find additional wood rat accumulations and in the intermediate cross-cut we came across one well kept nest. It was built up on the floor of the tunnel and looked very much like a comfortable old hen's nest, but instead of eggs we found four or five handsome young rats, gray little fellows with fine fluffy soft fur, large ears and bright black eyes.

While we were admiring this litter, much to our surprise the intrepid mother rat came to the nest and in the full glare of the mine lamps settled herself in a comfortable position. It looked as if the young rats had just ordered their breakfast and she would not postpone it a minute for our presence. But we were mistaken in her intention. After a few minutes she rose from the nest with a large burden clinging to her tits. Besides holding on with their teeth, the young rats had firm hold on the mother wood rat's bushy tail. Toe-holds, tail-holds, or possibly a combination of both secured them to her. The old rat made directly for the mine shaft, descending gracefully and proudly, "with her tail between her legs," into the inky darkness where there was nothing but the rough rock wall to cling to in the descent of fifty feet down to the lower tunnel.

It was a rare exhibition of strength, a novel means of transportation. We had seen a wood rat jitney and a rather startling confirmation of the fact that wood rats are skilful climbers.

Wood rats must take to climbing as naturally as ducks to water, judging from the location selected in this mine for nesting and rearing their young.

The second example of mother courage was soon to follow, open to the light of day. We found the trail down Marsh-Adams (Porcupine) Creek below the mountain basin and crossed snow-slide ground bearing abundant vegetation at this time of the year. The trail was hard to follow for it was almost wiped out for considerable distances, where bears had been harvesting roots and gophers. The grizzly bear is quite a digger, displacing heavy boulders in efforts to have a taste of fresh meat.

We were well down below timber line, crossing through patches of huckleberry bushes. The prospector called our attention to several tin cans riddled with holes, near the trail. He had on an earlier trip taken these tins down the trail with the intention of gathering some berries. They were old jam containers left with the tops pressed on hard. A grizzly had found the tins and punctured them badly with tooth holes. Half a dozen tins were scattered about in a crushed and flattened condition.

The grizzly is a powerful animal and intelligent enough to keep out of sight of man. If given due warning, he will gallop off up a rough mountain side with the speed of a race horse. His claws are not constructed for tree climbing, they lack the proper curvature, and for this reason the grizzly bear must remain on the ground, take to flight, or show battle. When discovered in an open space he will make for the timber.

The grizzly bear has the reputation of being a land owner and he is apt to show battle if intruders come into his domain unannounced. The striking power of his forepaws is terrible. A prospector out hunting grizzly with a partner in the Selkirk, was dodging around a big tree to get out of the way of one of these bears. The bear struck at him and the tree got most of the blow, yet the bear's large claws came around the tree with enough force to hit the man a stunning blow on the forehead. The bear's efforts were arrested at this point by a lucky shot from the partner's gun.

Man and the black bear can get up a tree away from immediate danger, if they are quick enough and if there happens to be a tree at hand. The black bear has been seen with young cubs dangling from her flanks, holding on by their claws as the mother charged through the forest in flight. Young grizzly bears would have no such holding on power. I have never heard of a grizzly bear carrying the young to safety.

Below where we had seen the mutilated jam tins, repeated snow slides had heaped snow high

in places along the valley bottom and much of it still remained in spite of summer heat. It was on one of these large snow patches that we spied the bear family as our trail brought us around the crest of a low ridge. Two yearling cubs not far away were boxing and tumbling around on the snow. We stopped to watch them for we were quite uncertain whether they were playing or quarrelling. We soon spied the mother bear, an immense animal stretched full length on the snow napping or taking a sun bath. The young bears rambled down on the snow and began to frisk around and over their mother. The old bear raised her head and assumed the attitude of a big dog reclining in an attentive position. It was plain that those young bears could grow a great deal more before they would be as big as their mother.

The bear family were two hundred yards from the trail and on the east side of Marsh-Adams Creek, while our point of observation was on the west side of the Creek. A boisterous stream ran between us and the bears. Yet I must admit we were a bit nervous, for it had not been long since the bears had crossed that stream. We had seen on the trail, fresh signs of bear and the scent of bear still clung to the bushes.

We were anxious to get a good picture of those bears and a little more anxious to know what would happen when they discovered us. There was no tree at hand, and it gave some measure of comfort to know that we were with a prospector who had tamed a few bears and his 30-30 Winchester might do some more taming should occasion arise.

The wind was in our favor, yet it was not long before the old bear became restless and began to sniff the air. It was certain that her nose was the principal locator, for she got up and walked towards us. The prospector assured us that the bear's eyesight was good only for close-up observation. The grizzly was soon satisfied that we were no friends of hers. She got up on her

hind legs and would drop down and come a little nearer and then repeat her performance. At the nearest approach, all three bears were standing on their haunches, a cub on either side of the mother bear. The young bears were intently watching their mother as she diagnosed the air. It was plainly the business of the mother bear to sound the retreat or continue the advance.

They say a grizzly bear is powerful, deliberate and quick to act. We felt the truth of the first two qualities and were waiting to see what might follow to prove the third. The mother bear was very deliberate, standing there on her haunches, champing her teeth, her mouth wide open at times and a long tongue circling about her face. We did not know whether she was foaming with rage or just nervous or possibly licking her chops at prospects of battle. The creek made so much noise that it was impossible to say whether there was any snarling in connection with all this grimacing. I think it must have been a demonstration of pure ugliness for she suddenly turned and drove the cubs off up the snow in a very undignified and formidable manner, scarcely pausing at the edge of the timber. It looked as if the young cubs had expressed a wish to come over and see us, but it had not met with mother bear's approval.

I learned some weeks later that the very excellent and heavy camera packed by the engineer who was with us, had failed to put on record what would have been some rare pictures. Heavy, thunder-clouds were threatening and the most acceptable thing had happened in the retreat of the grizzlies. Hastening along the rocky trail, we arrived at Spencer in a drenched condition. We had been seeing live things that morning and had no thought of the discomforts of packing in the rain. There is only a small cabin at Spencer, so we made a camp fire and a cup of tea in the open. The sun was shining by the time we were ready to continue our journey.

NOTES ON THE WATER-BIRDS OF LAKE NEWELL, ALBERTA

BY J. A. MUNRO, OKANAGAN LANDING, B.C.

THE recent agricultural development in the dry belt of Alberta that has been fostered by the Canadian Pacific Railway Company has led to important changes in the bird-life of the district, particularly in the vicinity of Brooks. Following the planting of grain and fodder crops, gardens and shade trees in this district, came an influx of land-birds, attracted by the insect hordes which

invariably attend agricultural activities in a new country. The increase of passerine birds that closely follows the settlement of prairie or woodland is a phenomenon familiar to every bird-student and that the Brooks region should attract and hold many species of land birds is not particularly notable. The novel feature in this instance is, that not only was there a conspicuous

increase of land-birds but there was an invasion of water birds as well. While the growth of rural districts is favourable to the increase of various species of land birds, the reclamation of marsh-land usually connected with such development entails the reduction of water-birds on a large scale. In this case there was a reversal of the usual process caused by the creation of an artificial lake to hold the Company's water supply.

This reservoir, known as Lake Newell, lies in a natural basin five miles south of Brooks; its area is approximately twelve thousand acres and its maximum depth twenty-seven feet. The water is taken from the Bow River near Bassano and reaches the reservoir through two main canals, one entering at the north end and one at the south. The surrounding land is non-irrigable and there are no farms near the lake. Apart from the spillways and the few concrete dams which link up the ridges forming its shore line, Lake Newell has not the appearance of an artificial lake. The littoral is barren and sandy without brush or tree growth and at the time of my visit (June 29th and 30th, 1921) the sparse growth of short grass was burnt crisp while the low *Artemisia* and the several species of cacti indicated the prevailing desert conditions.

At first glance this arid waste surrounding the lake seemed most unfavourable for the study of bird life, but close inspection showed that various modifications, not at first apparent, had taken place during the seven years of the lake's existence. *Potamogetons* and other water-weeds eaten by Ducks have drifted in through the canals and in the warm fresh water they have thrived and spread to all parts of the lake. Masses of these weeds that have been uprooted by storms frequently cause trouble by drifting against the mechanism of the headgates and interfering with their operation. Accompanying these water-plants have come their attendant insects and mollusca. Fish also have entered the lake through the same channel and several species are now well established. With this abundant food supply there naturally followed an invasion of water fowl. The attraction of the fresh water and the insect and plant food was so great that these water birds remained to breed in greater numbers each year, adapting themselves to the unfamiliar environment. I found that Ducks were nesting under an artemisia, or a Russian thistle, or in any slight cover available on the barren shores of the lake. A Blue-winged Teal built her nest on one of the trails by the lake where a shallow depression between the wagon ruts offered an inducement. The bird flushed from almost under the bonnet of the car as we jolted along the rough trail—probably she was familiar with this form of

disturbance. The seven eggs appeared hard set, so let us hope her good luck held to the end.

Scattered over the lake are a number of small flat islands—hill summits before the lake was made. The majority of these are less than an acre in extent and have obtained full measure of benefit from the life-giving water. This is manifested by the luxuriant growth of thistles, mustard, lambs' quarters, and other imported weeds—a thick jungle of vegetation. Poplars and willows are also springing up and their growth should be phenomenal. On these islands, free from molestation by predatory animals, the greater proportion of water fowl have chosen to breed. I was familiar with Pelican colonies, with Gull and Tern colonies, but never before had I seen breeding colonies of Ducks. For on several islands Ducks' nests were so plentiful and so close together one had to walk carefully to avoid treading on the eggs. On one island of approximately one-third of an acre I counted thirty nests of the following species: White-winged Scoter, Scaup, Pintail, Gadwall, Mallard and Baldpate. All these nests contained the full complement of eggs and all showed indications of being well advanced in incubation. Several of the nests contained eggs of two species, an indication of the crowding on the island. A Gadwall's nest contained six Gadwall eggs, two Mallard eggs, one downy Gadwall and one downy Scaup. The Scaups have an unpleasant habit of fouling their nests when they are flushed and one wonders if this is done as a protection for their eggs and against what enemy. It was too late in the season to see breeding Canada Geese, but one old nest was found and I was informed that five or six pairs bred on the lake. One pair nest on each island in splendid isolation. I was told they will not tolerate any Ducks in their vicinity. If this be so it is fortunate that they are such early breeders. Waders were represented on this island by two pairs of Avocets, two pairs of Killdeer and one pair of Spotted Sandpipers.

Another of the islands visited contained a breeding colony of Common (?) Terns, estimated at two hundred pairs, three pairs of Avocets, and as many breeding Ducks as were found on the first island. From a distance the shore of this island appeared snowy white with Gulls, which on closer inspection, proved to be Franklin's. As the boat drew near the island they rose in three sections, circled over the boat several times, and then flew to an adjacent island where they settled on the beach to rest as before. These birds were about twenty miles from their breeding ground, which is established in a marsh covering several sections, southeast of Lake Newell. They were all adults and their inactivity in the height of the

nesting season and at such a distance from their breeding ground would lead one to surmise that the sexes segregate after the eggs are laid and that the males take no part in the subsequent domestic duties.

The Terns, which were hardly distinguishable amongst the great wheeling flocks of Gulls, remained circling over the island after the latter had departed. Their rather well-built nests of grass, the majority of which contained two or three eggs each, were found everywhere on the island, hidden in the thick woods. They showed a wide variation of color and markings, ranging from a pale greyish-green, lightly spotted with black, to a rich olive, blotched with sepia. A few nests contained downy young and several youngsters beginning to feather out were seen hiding in the

woods. Avocets were also breeding here and the downy young, preposterous balls of fluff on attenuated legs, scampered over the sand and into the water where they rode as buoyantly as corks. At one time I held the downy young of Scaup, Tern and Avocet in my hand where the tiny olive, grey, and fawn morsels relaxed contentedly as if glad of the warmth.

Lake Newell is of particular interest at the present time owing to the recent proposal that it be created a Bird Sanctuary under *The Migratory Birds Convention Act*. This project has the sympathy of many of the residents of that district and the foregoing notes are submitted as evidence that there will be no lack of tenants for the proposed refuge.

THE HUNGARIAN OR EUROPEAN GREY PARTRIDGE

By F. BRADSHAW, CHIEF GAME GUARDIAN, REGINA, SASK.

CONSIDERABLE interest has been aroused among sportsmen by the appearance of the Hungarian or European Grey Partridge at many points in southwestern Saskatchewan, and those whose love of birds is due more to an appreciation of their economic and æsthetic values, than to their sporting possibilities, are equally delighted to know of this new addition to the fauna of the province.

The occurrence of a new species of bird or animal is also a matter of scientific importance, therefore it might not be out of place to record a few facts concerning the history of this new arrival.

The source of supply was undoubtedly in the province of Alberta, and I am indebted to Mr. Austin de B. Winter, of Calgary, Alberta, for the following interesting account of the introduction of the Hungarian Partridge into that province. Mr. de B. Winter states that:

"In about the year 1906 or 1907, three of us imported a few quail (Bob White) from Kansas which, however, arrived in extreme temperature towards the end of February, I think, and which, owing to being confined in heated cars in transit, contracted pneumonia or some disease to which they very shortly succumbed after they were liberated.

The following year we renewed our efforts and secured funds from other sportsmen, resulting in our importing about fifteen pair that spring, and about a similar number of Hungarian Partridge that fall. These were liberated about ten or twelve miles south of Calgary. Later importations were made, and to the best of my recollection,

the total number of partridge liberated did not much exceed 150 birds, if indeed it reached that number, and these continued to multiply and spread all over the province.

"After 1914, I think, an open season with a bag limit of 25 birds was established, and a full month's open season, and sometimes two, has since been maintained, the present season's bag limit being 50 birds. These birds have increased unbelievably, and have literally spread all over the province. My impression is that they have practically all radiated from the point at which they were originally liberated.

"It is true that small quantities of five pairs or so were liberated at distances, say 100 miles north and about 60 miles south. I am informed that they are to be found in districts around Edmonton and North of Edmonton towards the Peace River (which I can hardly credit), and it is known that they have spread as far south as the international boundary.

"I have seen these birds at distances of 150 miles North and West of Calgary.

"So much at any rate for their spreading propensities, and you will observe that the birds have spread into new districts, notwithstanding the fact that in the new districts to which they have spread there has been an open season, and apparently no particular effort made by people to preserve them.

"The bird likes the stubble and seems to thrive well in prairie country. It is not a brush bird, although, naturally, cover affords protection from vermin. The bird is wonderfully prolific and

broods of twenty are frequently to be seen. Should casualty overtake the female, the male will bring up the family.

"The birds are extremely hardy, are of economic value, and seem to relish not only insects, but a great many of the weed seeds, such as wild buckwheat, etc.

"Our birds were imported direct from Hungary by Wenz and MacKensen of Yardley, Pennsylvania. The business is now operated by Mr. Wm. J. MacKensen, who, by the way, is a Canadian.

"I have had repeated enquiries from various parts of Canada, and from numerous clubs who wish to secure these birds. During the war, of course, it was impossible to obtain any, and while I have renewed efforts since, Mr MacKenzen informed me that he thought it would be some time before he could renew the importation of the birds, as the prices were prohibitive."

As a general principle, the introduction of foreign birds or animals is a very dangerous proceeding, for, although the introduced species may thrive, it may also become detrimental to the welfare of the native and more desirable species of animal life, and the benefits derived may not compensate for the losses sustained. For proof of this, we might cite the introduction of the rabbit into Australia, and the liberation of the House Sparrow on this continent, both of which, in their new environments, have become pests of the worst kind. With the view to finding out what effect the introduction of the Hungarian Partridge had on the native game birds of Alberta, I referred this matter to Mr. de B. Winter, who, I am pleased to say, anticipates no serious developments along this line, as may be seen by his reply, which, in part, is as follows:

"I am glad you mentioned this phase of the subject, because I should have added that these birds are not antagonistic to our native birds in any way whatever, and knowing what I do of them in European countries, I did not expect they would be. Pheasants on the other hand, as you know, do interfere with partridges, often laying their eggs in partridges' nests."

So much for Alberta's contribution to the establishment of this bird east of the Rockies. We will now return to the facts that relate to Saskatchewan. The first intimation received by the Department of what was undoubtedly the Hungarian Partridge, was from Mr. Geo. H. Coulter, of Piapot, Sask., who, under date of November 23rd, 1921, wrote as follows:

"Have seen some small birds around here this fall, thought they were quail. Have been told they are Hungarian Partridge from Alberta. Have a close season put on them, so they will get a chance to multiply. They flush together and

run on the ground, so will need protection."

About the same time we were advised by Professor J. S. Dexter, that a specimen of the Hungarian Partridge had been sent to the Saskatchewan University for identification by Mr. Russell Martin, of Rutland, which point is located in township 41, range 25, west of the 3rd meridian, about 20 miles east of the Alberta boundary. Mr. Martin writes that he "Saw a flock of 15 or 20 of these birds at the edge of a wheat field, about the first of September, and about the first of November, picked one up from beside the road three miles from where he saw the flock. It had apparently been killed by flying against a telephone wire. This is a hilly rough country, with considerable brush and sloughs and pot holes. About half the land is farmed."

Our first introduction to this bird in the flesh was through the kindness of Mr. C. H. Martin of Wilkie, and the manner in which the two birds submitted by him were obtained is worthy of note. They were hit by a passenger train just west of Wilkie, on the evening of January 5th, 1922, and were found on the front of the engine on the arrival of the train at the station. It is reported there was quite a flock of these birds, but no information as to the approximate number is given. Both these specimens are now on exhibit in the Natural History Museum at Regina.

Many other reports in substantiation of the advent of this bird have been received. Mr. D. J. Huntley, Saskatchewan Landing, writes: "While riding in the river brakes this fall, I startled a pair of birds identical to the partridge found in England. Is this the Hungarian Partridge?"

We are also advised by Mr. F. Doiton, of Valor, that a covey of eight birds were seen south of Twelve Mile Lake, township 5, range 2, west of the 3rd meridian, about 200 miles east of the Alberta boundary, and that other birds have been seen in that locality, and Mr. C. A. Millie, of Piapot, informs us that he saw a covey of Hungarian Partridges about ten miles southwest of his town.

With such a pleasing nucleus of birds for breeding purposes, at widely separated points in the southwestern portion of the province, there seems every likelihood of the Hungarian Partridge becoming well established, and with the object of affording the protection necessary to enable it to increase by natural process, The Game Act has been amended, making it unlawful to shoot these birds at any time.

The co-operation of all persons interested in the welfare of this new game bird is respectfully solicited, and the Department will be interested to hear from any other persons who observe this bird for the first time.

INJUDICIOUS FOSSIL COLLECTING

BY E. J. WHITTAKER

A CERTAIN wise man called Pope many years ago declared that "a little knowledge is a dangerous thing." With prophetic vision he looked forward into the twentieth century when the general public would be treated to many and varied forms of "little knowledge." One of the most interesting developments in this regard is the almost universal instruction in elementary natural history. Boys and girls become scouts and guides and sally forth to delve into or rather to uproot the secrets of nature. With the natural impetuosity of youth this process often gives results other than those expected and leads us to conclude that a genuine love of nature, which protects rather than destroys, is still dormant. We have lately had frequent examples of this tendency. In certain parts of New York state, the girl guides have been so impressed by the beauty of the trailing arbutus, encountered in their natural history excursions, that it has now ceased to exist. Why? It has been transplanted to the city homes of the guides where it did not stand a chance of surviving. In another part of the same state a group of boy scouts, by industrious application of the knowledge imparted in a woodcraft and trapping course, have almost exterminated the fauna of that area. Bird life is being saved, not by the "little knowledge" of the elementary courses in schools, but by further intensive instruction, propaganda, and drastic laws. The writer wishes to enter a plea on behalf of a class of objects which cannot defend themselves, whose destruction cannot be repaired, and which can suffer extremely under the hands of an inexperienced amateur collector, to wit, fossils.

Fossil collecting is an interesting and instructive pursuit and our knowledge of the distribution of fossils has been increased quite as much by the many collectors throughout the country as by the professional palaeontologists. For the amateur collector the article by Dr. E. M. Kindle, of the Canadian Geological Survey, is very useful.* In it is expressed the fact that haste is taboo and hard work and patience are essential. This rule does not appeal to many amateurs who still fail to realize the importance of a fossil, with the result that many of these remains are ruined by careless and hurried attempts to extract them from the matrix. A good example of this van-

dalism was observed a short time ago in Hull.

The Hull limestone quarries have been famous for many years on account of the abundance and preservation of their fossil remains. Of these the crinoids and cystids are most valuable on account of their beauty, perfect preservation and rarity. The fine collections of the late Elkaniah and Walter Billings represent many years of enthusiastic search for these forms in this locality. While looking over these beds the writer came upon a heavy bed of hard limestone about ten feet square whose surface was covered with crinoids. Someone who had realized their value had endeavoured to remove them and had succeeded only in ruining them all and leaving their mangled remains to sadden the eyes of those who followed. The only method of removing these specimens was to channel carefully with a chisel to a depth of at least half an inch all around the individual fossil and then the whole could be removed easily. But this might require half an hour to obtain one specimen and the individual who had desecrated this plot could not afford to spend so much time and energy in getting one perfect specimen which would have been a source of pleasure to him for all time to come. For the fossil has this advantage, it neither fades nor decays after being gathered. This example at the Hull quarries is mentioned because of local interest, but the writer has observed similar ravages elsewhere. So he wishes to incorporate an unofficial "Society for the Protection of Fossils" without officers or fees, but to whose tenets all who are interested in and realize the importance of these ancient remains should subscribe. Besides the manual of instructions cited above the following rules of ethics should govern its members:

1. Do not endeavour to extract an important or rare fossil without adequate tools and a proper conception of the procedure to be followed. It is better to leave it for the time, even to another collector, than to destroy it.

2. The preservation of the fossil is the main object sought. It pays to take a little more time to get the specimen out complete.

3. Where specimens are scarce do not remove every individual of each species which can be seen at a given locality, thus emulating the "game hog" in hunting. At a later date, to back up or confirm previous data, it is advisable to be able to relocate readily such forms.

Observance of the above rules of conduct, which

*KINDLE, E. M., Fossil Collecting, *Ottawa Naturalist*, Vol. XXIX, No. 10, Jan. 1916.

will be prejudicial to no one, will result in a greater feeling of satisfaction on the part of the amateur collector, and will certainly obviate unkind

thoughts such as those that passed through the writer's mind on viewing the shattered crinoids in the Hull quarry.

PROSECUTIONS

Migratory Birds Convention Act by Officers of the Dominion Parks Branch and Royal Canadian Mounted Police.

REPORTED DURING THE PERIOD—FEBRUARY 15,
1922—MAY 4, 1922.

Horton Quindley, Stony Island, Shelburne Co., Nova Scotia. Shooting a Guillemot. Case dismissed.

Horton Quindley, Stony Island, Shelburne Co., Nova Scotia. Having in possession a Guillemot. Fine \$10.00 and costs.

Albert E. Petty, Thessalon, Ontario. Killing a Pileated Woodpecker. Fine \$10.00 and costs.

Clifton Woodard, North Hatley, P.Q. Having in possession a Wild Duck. Fine \$10.00 and costs.

Robie Wagner, Central Port Mouton, Queens Co., Nova Scotia. Attempting to kill a Horned Grebe. Fine \$10.00 and costs.

Ralph Amy, Ayer's Cliff, P.Q. Possessing a Bittern. Case dismissed.

John F. McKinnon, Glace Bay, C.B. Having in possession a Canada Goose in close season. Fine \$10.00 and costs.

Thomas Dustin, R.R. No. 2, Ayer's Cliff, P.Q. Possessing a Pileated Woodpecker. Fine \$10.00 and costs.

Michell Bowers, Digby, Nova Scotia. Attempting to shoot an American Golden-eye in close season. Seizure—One shot gun. Fine \$10.00 and costs (suspended).

James Currie, Charlottetown, Prince Edward Island. Hunting a Canada Goose in close season. Fine \$25.00 and costs.

Charles W. Patterson, Charlottetown, Prince Edward Island. Hunting a Canada Goose in close season. Fine \$25.00 and costs.

John M. Roop, Charlottetown, Prince Edward Island. Hunting a Canada Goose in close season. Fine \$25.00 and costs.

Vernon Gay, Charlottetown, Prince Edward Island. Hunting a Canada Goose in close season. Fine \$25.00 and costs.

Gordon Worth, Charlottetown, Prince Edward Island. Hunting a Canada Goose in close season. Fine \$25.00 and costs.

NOTES ON BIRDS IN SOUTHWESTERN SASKATCHEWAN

BY L. B. POTTER

THE valley of the Frenchman River is about the northern limit of the Sage Grouse in southwestern Saskatchewan. At this point, 5 miles above Eastend, the bird was never very numerous, and we seldom saw a band exceeding 8 or 10 in number. The Sage Grouse becomes very tame if left alone and some years ago we were troubled with the young birds trespassing in our garden, where they would eat the hearts out of the lettuce plants. Scaring them off had little effect, but we managed to supply ourselves as well as the Sage Chickens with lettuce in the end. On another occasion I have seen a couple of youngsters enjoying a dust bath within 20 yards of the stable door. But the coming of the railway up the valley changed all this and between 1914 and 1920 hardly a bird did we see. However, on the wide flats below Eastend and all the way to the international boundary, I believe there have

always been fair numbers, and during the past winter we have been glad to see a little band of 8 or 9 generally on our own land; and we hope they may decide to remain here to breed. There were two "dancing-grounds" within a mile of this house and quite frequently I used to steal up close and watch the proceedings. The Sage Grouse at ordinary times is very inconspicuous, harmonising well with the sage-brush in which, for the most part, it feeds, but the white air-sacs of the male birds at the pairing season can be seen a mile away; and the sight of these white objects moving about certainly puzzled me at first, for without field-glasses the rest of the bird is quite invisible so far away.

During the winter of 1921-22 several Rosy Finches (*Leucosticte tephrocotis*) appeared in the valley. A bird of the Rocky Mountains in summer, during the winter months it wanders

over the prairies as far even as Manitoba. We collected a few specimens, which are now in the Provincial Museum at Regina. I first noted the bird in November, 1912; probably it visits this locality in more or less numbers every winter. Excepting once, I have seen them only in and around our corrals and stackyard where they feed on weed seeds like other finches. During the winter of 1916-17, I saw or heard of several and while sitting in the train noticed a couple feeding with some House Sparrows at the foot of a grain elevator in Eastend. It is a silent bird and its

only note is a soft "que, que" when disturbed. All the birds we saw were apparently *tephrocotis*.

For the first time in my experience a Crow tried to winter here, being seen on February 5th, and 6th. After that the weather turned very stormy and cold and we saw it no more.

The Horned Lark is now a resident throughout the year, though it may be that quite a number of our little winter birds are from the far north. They are certainly much lighter on the under parts.

NOTES AND OBSERVATIONS

Subscriptions for 1922 are now due; by paying promptly you will greatly facilitate the publishing of this magazine.

SKIN IRRITATION DUE TO PLANT POISONING.—Having been a victim at times to poison ivy, Mr. Gussow's paper on the subject was of considerable interest to me. If he has found an active cure to the complaint he has conferred a benefit on all out-door enthusiasts. I can testify that some people are more or less immune to its effects. As a child and a youth, I handled the plant fearlessly. Our place at Muskoka was over-run with poison ivy and it was only through my mother and I pulling it up by the roots (with bare hands as we would any other weed) year after year that it was eradicated. This was largely done in warm summer weather when perspiration was profuse. We crushed it into large baskets and carried it to the fire-place where we had almost nightly camp-fires. Neither of us showed any signs of poisoning though all the conditions seemed most favourable for it. Our immunity was undoubtedly constitutional.

Years after, again in Muskoka, my mother, not fearing the plant, attempted to clear a neighbor's place of it after the old method, and came down with a perfectly terrible case of ivy poisoning, whereby she was confined to bed for a week or more. Similarly I have since found that I could no longer expose myself with safety to the plant. Whilst not peculiarly susceptible, I have had several attacks on much slighter provocation than I used to offer to the plant in the old days. It is evident that whilst there are various degrees of partial as well as complete constitutional immunity towards ivy poisoning, the protection may be lost at any time. I do not doubt that various physical and physiological conditions affect susceptibility, but one would naturally expect that when the pores of the skin are being thoroughly flushed outward by profuse perspira-

tion, it would be one of the poorest times for external poisons to be transfused inward.

During comparatively moderate attacks on the hands, especially in the soft skin between the fingers, I found that a thorough washing with coarse laundry soap gave more relief than anything else. Fine toilet soap, however, was almost useless. I took the strongest and harshest laundry soap and worked up a good lather on the hands, continuing the washing motion (which, under the circumstances is far from a disagreeable proceeding) until the lather vanished and the hands were practically dry. This may not cure, but it certainly gives relief from the intense irritation for from half an hour to an hour, when it may be repeated. The virtue in the treatment lies in the large amount of free alkali in the soap and the massaging, the soapy principle assisting the latter and preventing friction. The soap drying on the afflicted parts may also hold the alkali in place longer than an ordinary wash would remain. This is an easy remedy, always available, and is good at least for light cases.

It may also be noted that Poison Ivy, *Rhus toxicodendron*, is not the only plant that may cause these irritations. Poison Sumach (Poison Oak) *Rhus vernix*, is equally bad. One of our common green house Primulas is also a source of danger to many people, as well as that most beautiful orchid, the Showy Lady's Slipper, *Cypripedium hirsutum*. Whether the above treatment is equally effective with poisons from all these plants I cannot say.—P. A. TAVERNER.

EUPHYLLOPOD CRUSTACEANS FROM CANADA AND ALASKA.—A few additions and corrections to my article about this subject in this publication, May, 1921 (Vol. XXXV, No. 5), may be of interest:—

During a stay in London recently (January, 1922) I have assured myself that the specimens ("types") of Conchostraca from Canada mention-

ed by Baird are still in the British Museum of Natural History and preserved in pillboxes dry.

Those of *Limnetis gouldii* comprise three full-grown ($3\frac{1}{2}$ by 4 mm.) specimens from St. Ann's, P.Q.; and in the museum is also a vial with two other specimens of the same species, collected in fresh water at Montreal by Prof. Jukes and presented in 1890 to the British Museum by Prof. Rupert Jones.

When I was in Christiania, Norway, November last, Prof. G. O. Sars there told me that he felt sure that Baird's species, *L. gouldii*, is the same as the well known North European species, *L. brachyurus*. He has now received specimens of *L. gouldii* from Ottawa, so as to decide this point by rearing and comparison of the two species.

Baird's "type"-specimen of *Estheria caldwelli* is a dried shell, 8 by 5 mm. in size. There is no information about when it was collected in Lake Winnipeg.

Though examining all the arctic Euphyllipoda in Scandinavian museums (besides in London) I have been unable to find any definite records of *Lepidurus arcticus* from Labrador or of *Branchinecta paludosa* from Spitsbergen.

The following corrections should be made in the same number of the "Naturalist":—

P. 92 (under Muller, O.F.) Omit the word *Prodromus*, and read 1788 instead of 1777. On p. 100 read *Camden Bay*, instead of *Canadian Bay*.

P. 93: Sahiberg's paper was published in Helsingfors, 1875.

P. 94: Under Brehm, read Vol. 45, instead of Vol. 34.

To the bibliography on pp. 92-94, add the following works:—

Herbst, J. F. W.—Versuch ein. Naturgesch. der Krabben und Krebse, etc., Vol. II, Berlin und Stralsund, 1790-1804.

Dybowski, B.—Beitr. zur Phyllopodenfauna der Umgegend Berlins, etc. (Arch. für Naturgesch., 26 Jahrg., Berlin, 1860.)

Wierzejski, A.—Geographical distribution, etc. of *Branchinecta paludosa*, O.F. Muell. (in Polish) Cracow, 1882 (1883).

Lilljeborg, W. *Limnadia gigas* (J.F.H.) forekomm. i Sverige (Ofvers. Kgl. Bet. Akad. Forh. for 1871, Stockholm, 1872.)

Lilljeborg W. Synopsis Crust. Suec. Ordin. Branchiopod. et Subord. Phyllopod. (Nova Acta Reg. Soc. Scient. Upsal., 1877.)

Lilljeborg, W. Beitr. z. Fauna der Baeren Insel, 3, Entomostraceen (Bih. t. Kgl. Vet. Akad. Handl., Bd. 26, Afd. IV, Stockholm, 1900.)

Guerne, J. de, et Richard, J. Sur la faune des eaux douces du Groenland (Compt. Rendus hebdom. des seances de l'acad. des sciences, Tome 108, Paris 1889.)

Sars, G. O.—Bemaerkn. om de til Norges Fauna hoer. Phyllopoder (Forh. Vid. Selsk. for 1873, Christiania, 1874.)

Sars, G. O.—Crustacea Norske Nordeksped. 1876-78, (Vol. VI, Christiania, 1885-86.)

Richard, J.—Entomotr. recueil. par M. Ch. Rabot a Jan Mayen et Spitsbergen (Bull. de la Soc. Zool. de France, Vol. 22, Paris, 1897.)

Richard, J.—Sur la faune des eaux douces explorees en 1898 pendant la campagne du yacht "Princess Alice" (Mem. de la Soc. Zool. de France. Vol. II. Paris, 1898.)

Linko, A.—Beitr. z. Kenntn. der Phyllopodenfauna des europaeisch. Russlands (Trav. de la Soc. Imper. des Naturalistes de St. Petersburg, Vol. 31, 4, 1901; in Russian.)

Zykoff, W.—Zur Crustaceenfauna der Inse Kolguljev (Zool. Anzeig., Bd. 28, 1905.)

Juday, C. and Muttowski, R. A.—Entomostraca from St. Paul Island, Alaska (Bull. Wisc. Nat. Hist. Soc., Vol. XIII (new series), 1915.)

Dahl, K.—Studier eg Forsoeg over Oerret og Oerretvand, Christiania, 1917 (tables).

Lundblad, O.—*Branchinecta paludosa* and *Polyartemia forcipata* in Haerjedalen; some new localities for *P. forcipata* and *B. paludosa* in Sweden (Entom. Tidsskr., Stockholm, 1914-15).

Lundblad, O.—Vergl. Stud. ueb. die Nahrungsaufnahme einig. schwed. Phyllopoden, etc., (Arkiv f. Zoologi, Bd. 13, Stockholm, 1920).

Olofsson, O.—Suesswasser-Entomostracen, etc. von Murmankueste, etc. (Zool. Bidr. fr. Univ. Uppsala, Vol. 5, 1916-17).

Haaberbosch, P.—Die Suesswasser entomotraken Groenlands (Zeitschr. f. Hydrologie, Jahrg. 1, 1920).—FRITS JOHANSEN.

THE STARLING IN MAGOG.—On Saturday, the 11th of March, 1922, a Starling (*Sturnus vulgaris*) put in its appearance in Magog.

I came across the bird suddenly on leaving my office at 1.15 p.m. It was feeding, in the middle of Main Street, with some English sparrows, who, with their customary cheek and curiosity were keeping a close watch over the new-comer.

The Starling had nothing to fear, however, as it is a much larger bird, being $8\frac{1}{2}$ inches in length, and its first concern seemed to be its appetite; it had evidently just arrived and was, naturally, hungry. It later proved to be a male bird. While I was observing, he perched for a few moments on a tree and then resumed his feeding on the ground, working along the roadway to the Dominion Textile Company's Stables, which subsequently became a kind of food-emporium for him as it is for a certain band of sparrows. I was unable to follow up my new acquaintance until Monday, March 13th, when I found him at his

same quarters, with the same bodyguard of sparrows. When not working—i.e., between meals—he would sit quietly on a slanting, low roof and preen his beautiful feathers.

The bird reminds one forcibly of the Meadowlark (*Sturnella magna*) especially by the shape of its head and the long beak and short, square tail, the two last features being even more accentuated than in the Meadowlark. A resemblance is implied in the generic names of the two species, viz. '*Sturnus*' and '*Sturnella*,' although they belong to two different families, the Sturnidae and Icteridae. The plumage of the Starling is glossy black with metallic reflections of green, blue, purple and even lavender colors, according to the way the light strikes the feathers. Most of the feathers are tipped with buffy spots, giving the bird a spangled appearance. The elongated, spear-like bill is mainly yellow and the sturdy legs, which "run" and do not "hop", are brown red, almost an Indian red.

The Starling is a native of Western and Central Europe, migrating in winter to Southern Europe and Northern Africa. It is one of the commonest and best known birds in England, where it is met with in swarms following cattle and sheep, alighting on their backs to feed on the ticks which infest them. It feeds on the ground, eating cut-worms, grasshoppers, grain, etc., and it also perches in trees and shrubs, including fruit and berries in its diet.

The birds were introduced into this country over 30 years ago; 60 individuals in 1890 and forty more in 1891 were liberated in Central Park, New York City, from which vicinity these birds and their progeny have gradually radiated around the country for several hundred miles and can now be reckoned in the millions.

The Magog bird probably came up the Connecticut River Valley.

The Starling is a hardy and tenacious bird, and with the English Sparrow (another importation) tends to keep away other more beneficial insectivorous species. Like the Sparrow, too, it will probably become a nuisance and a pest unless its increase is artificially checked.

I collected the Magog bird on the 13th instant and found on dissection that it was a male and apparently a non-breeder. The present record would indicate that the migratory instinct is asserting itself and that the species can now be considered as fully naturalised. We may confidently expect more of these birds from now on.—F. NAFIER SMITH, Magog, Que.

NOT A PLESIOSAUR.—The newspapers of late have had a great deal to say about the strange animal which has been seen in Patagonia, and in

nearly every case it is spoken of as a plesiosaur. What the strange animal will prove to be, the writer would not attempt to guess, but a few remarks about plesiosaurs will show that there is little chance of Prof. Onelli capturing a live plesiosaur.

The plesiosaur lived from Triassic to Cretaceous times, but not a bone of any genus of the order has been found in rocks of more recent age than Cretaceous. This means that plesiosaur has been extinct for more than three million years. The Patagonian monster is reported as being very huge, so heavily armoured that a bullet could not penetrate to the vital organs, and as having made a great path through the forest. Some plesiosaurs were very large, though many were of moderate length, some being less than ten feet long, and none were covered with a bony dermal armour. The fore and hind limbs both constituted flippers or paddles similar to those of a whale and were not adapted for walking but were purely swimming organs. Most genera of the order Plesiosauria had long snake-like necks and small heads with sharp conical teeth suitable for catching living fish, which were probably their main diet. Smooth pebbles, which it is thought were used to aid digestion, have been found in the stomach. The paddles were the main means of propulsion, the short tail probably serving as a rudder.—C. M. STERNBERG.

DOVEKIES AND MURRES PICKED UP DEAD AND DYING.—The past winter appears to have been a hard one for various species of our more northern water birds. About the middle of December, 1921, Dovekies were reported from different sections in Kings and Annapolis Counties, Nova Scotia. Always were the stories the same—birds picked up unable to rise and very much emaciated. Many of these were picked up miles from salt water and all attempts to induce the weakened birds to eat were fruitless. Reference to my records shows that between December 11th and January 19th, there were thirty-seven individuals reported to me, nine of which were brought or sent by mail, in the flesh. In addition to the above, a report from Digby Basin reads as follows: ". . . at Bear Island the remains of several Dovekies were discovered where they had been devoured by Crows." Of the nine which I had an opportunity to examine, all were in a similar starved condition, five being dead when received and the other four surviving only a few hours. The internal organs were so dried up and wasted that I was unable to sex any of the specimens handled.

On December 19th, five were brought to school by children at Truro who had picked them up at

different points by the wayside after leaving home. These were all alive and had apparently fallen during the night, possibly attracted by the lights of the town over which they flew bewildered until exhausted. Eight others were reported from the vicinity of Truro about the same time. Between the 23rd and 28th of December, there were seven found about the town of Annapolis Royal.

Five Murres were reported from January 30th to February 18th, all of which were alive at the time they were discovered. Four of these were sent to me and on examination proved to be Brunnich's Murres. Two were taken under conditions which seem noteworthy: On January 30th a neighbour was driving across the dyke at Port Williams when his attention was attracted to a bird which was flying towards him swiftly. It was about to pass in front of him when it struck the telephone wire with a crash which sent it spinning to earth with a badly fractured skull. It lived only a few moments. When it was handed to me it was still warm. It proved to be a female Brunnich's Murre and was a very large one, measuring exactly 20 inches from tip of bill to end of tail. The other measurements were as follows: Wing, 8 in.; Tar., 1.50 in.; Bill, 1.25; width bill at nostril, .48 in. Another was discovered on the 10th of February, standing erect in the snow holding two cats at bay. These would attempt to strike the bird with their claws and one had succeeded in giving the Murre a severe cut on the throat, though only skin deep. The bird, with the use of its bill and powerful thrusts, was able to look out for himself remarkably well.

Mr. Forbush of Boston reports that Dovekies, Brunnich's Murres, and Razor-billed Auks have been common all along the New England seaboard and by way of explanation states that evidently some disturbance has occurred in the north and there "must have been some tremendous storms at sea."—R. W. TUFTS, Wolfville, N.S.

COWBIRD IN NOVA SCOTIA.—On the 17th of April, 1922, I had the pleasure of meeting with a Cowbird for the first time in my field experience in Nova Scotia.

This was at Kingston Station, Kings County, where the bird was feeding on the ground by the roadside. At the approach of the car it flew to the nearest apple tree, some 25 feet distant, and sat there wiping its bill in a manner which showed slight concern for the car, which was brought to an abrupt stop. The bird was a male and in very fine plumage. This appears to be the first record from this part of the Province, though

several Cowbirds have been reported from Yarmouth County.—R. W. TUFTS, Wolfville, N.S.

EARLY NESTING OF THE AMERICAN GOSHAWK.—In the cases of ten nests of this species which it has been my good fortune to examine during the past 15 years, or so, it has been possible to determine that the eggs were laid about the 1st to the 10th of May. On the 16th of April this year I collected a set of 3 Goshawk's eggs which were slightly incubated. This nest was examined on the 6th of April, and on that date held two eggs. The nest was in a medium-sized beech tree, about 35 feet up, and well fastened in the first crotch. An attempt was made to photograph the bird at the nest and a blind was constructed for that purpose. She returned within about 50 yards several times, but apparently her keen eye detected the changed landscape even at that distance and she quickly disappeared. The male bird was not in evidence and the female, an adult, was very wary, leaving the nest when we had approached within about 45 yards. She flew about for some time, uttering harsh cries, then disappeared, returning after a considerable lapse of time when she supposed we had left the woods.

These birds are remarkably uniform in their choice of building sites, seeming to prefer a low crotch in a medium-sized hard-wood tree and never (in my experience) more than 40 feet from the ground.—R. W. TUFTS, Wolfville, N.S.

NOTES ON SOME WINTER BIRDS OF THE GASPE PENINSULA.—In the early winter of 1921-22, I made a brief journey through the Gaspé Peninsula to Gaspé, Cap des Rosiers, Percé, and Bonaventure Island. I started from Matapedia, P.Q., on December 7 and returned there on December 12. On this journey I had, for the most part, little opportunity of observing birds except from the windows of trains or from sleighs, and therefore failed to identify many of the birds that were glimpsed. The following notes will, however, show something of the character of the avifauna of the region at that season.

Cephus grylle. **BLACK GUILLEMOT.**—About a dozen individuals of this species were seen swimming and diving just outside of the surf at Cap des Rosiers on December 9. In the waters near Bonaventure Island three of them were seen on December 10 and three on December 11.

Larus hyperboreus, **GLAUCOUS GULL.**—An adult specimen of this species, which appeared to be accustomed to the proximity of human beings, was studied at close range as it stood on the beach at Cap des Rosiers village on December 9. No other Gulls seen during the journey were posi-

tively identified, but, with one exception, all of the Gulls seen during this period which were near enough to be distinguished well were of the white-winged species. The exception was a bird, seen from the train near Gascons on December 8, which was thought to be an immature Great Black-backed Gull (*Larus marinus*). The number of Gulls which I saw during the short time which I spent in the Gaspé Peninsula averaged about half a dozen each day.

Harlelda hyemalis. OLD-SQUAW.—Forty seen at Bonaventure Island on December 10 and twenty-three at the same place the following day.

Somateria (sp. ?). EIDER.—Three seen off Cap des Rosiers on December 9 and about one hundred twenty-five in one flock at Bonaventure Island on December 11. Two of those at Cap des Rosiers and about twelve of those at Bonaventure Island were adult drakes.

Corvus brachyrhynchos brachyrhynchos. CROW.—Several seen from the train between New Carlisle and Gaspé on December 8. Two seen at Percé on December 10 and two at New Carlisle on December 12. I was informed that a few Crows sometimes pass the entire winter on the coast near Gaspé.

Pinicola enucleator leucura. PINE GROSBEEK.—A solitary individual seen on Bonaventure Island on December 11.

Lanius borealis. NORTHERN SHRIKE.—One seen on Bonaventure Island on December 10.

Planesticus migratorius migratorius. ROBIN.—One seen seeking food in a field blown bare of snow on Bonaventure Island on December 10 and 11.—HARRISON F. LEWIS.

BIRD NOTES FROM ST. THOMAS, ONTARIO.—During the exceptionally dry summer of 1919, Ruby-throated Hummingbirds collected in unusual numbers about a clump of Jewel Weed. Fourteen birds were counted on August 26th, and twelve on the 28th. This clump of weeds seems to have been the only attraction within a radius of some miles.

On August 26th, the same year, about an hour or so before dusk, an unusually large flock of Mourning Doves was disturbed feeding in a gravel pit. Forty-one birds were counted as they circled about.—C. E. JOHNSON.

BIRD ACCIDENTS CAUSED BY NETTING.—A Song Sparrow in Ottawa South entangled itself by the right foot in an expanded twist of poultry netting, breaking its leg by frantic exertions before it was released.

A Red-eyed Vireo killed itself in the same section of the city by coming in contact with a taut tennis net.

A Wilson Snipe on Echo Drive flew into a strip

of poultry netting used as a support for Sweet Peas but in this case was only momentarily disabled.—C. E. JOHNSON.

HORNED LARKS IN A CITY GARDEN-PLOT.—During a severe blizzard on March 28, 1919, a flock of eleven Horned Larks visited a garden-plot on Sunnyside Avenue, Ottawa. Nine of the birds, accompanied by one Song-Sparrow, came back the next day to feed on the weed-seed. The Horned Larks secured the seeds several inches above their heads by jumping. On March 30th no Larks were present, but a flock of about thirty Redpolls settled for a few moments; so actively did they move about that an exact count of numbers was not obtainable.—C. E. JOHNSON.

THE EUROPEAN STARLING AT ARNPRIOR, ONT.—On the afternoon of the 19th of April, 1922, business took me to McLachlin Brothers' "yard office," which is situated about 300 yards from the east bank of the Madawaska River at Arnprior, on the open road leading to the Mill Bridge. Between the office and the river, and 200 ft. or 300 ft. back from the road are McLachlin Brothers' extensive stables. Consequently the vicinity is infested with English Sparrows, who find lavish food and safe shelter about the buildings. On this day the level rocky space between the road and the stables was dotted with Sparrows as usual and more of them were hopping in the roadway and chirping from the fences. The English Sparrow is the most uninteresting bird in the world, and I was paying little attention to their all too familiar antics, when, as I approached the yard office, I noticed a strange bird among them on the road.

Classification always begins by connecting the unknown with the known. Resemblances are noticed first, and differences only in second place. My first thought was: "That is a queer-looking Meadowlark, and if a Meadowlark, what is it doing here out of its proper range." However, in a second I saw it was no Meadowlark, but a species new to me. A little smaller than a Robin, it was a long-bodied bird that walked deliberately on its short legs with a rather waddling gait. In the shadow its color seemed uniformly dark all over, but when it flew up onto a fence post, and caught the sunlight, its speckled plumage gleamed with iridescent greens and purples. This was no native bird, and none that I had ever seen in the flesh before, but the picture of the European Starling flashed to memory, and I realized that this latest imported pest had reached these northern latitudes at last. The Starling somewhat resembles the Meadowlark, but the relationship is a distant one, and it is strange

that the likeness was evident enough to strike me when I got a first glimpse of the bird. An hour or so later I saw him again picking around the stable yard, and still consorting with the Sparrows, who, however, did not suffer him gladly, but attacked him if he came too close.

I have no sympathy with those ornithologists who seem to regard it as an offence in a bird to be rare, and immediately shoot any uncommon visitant. "That'll larn him to be rare!" But the Starling threatens to become as great a nuisance as the English Sparrow, and as an authentic record of its spread is valuable, I had no compunction in collecting this unwanted immigrant. Accordingly, not being a sportsman myself, I arranged with a friend in the yard office to shoot the bird on its next appearance. The following morning it could not be found, but in the afternoon I discovered it feeding among some small cedars behind the stables, and gave the alarm to my friend, who hurried out with the gun, and, to use the technical term, the bird was "taken." The specimen was sent to Mr. P. A. Taverner at the Victoria Memorial Museum, Ottawa, so as to make official record of the occurrence. For an ornithologist is always a doubting Thomas, and when you tell him about some unusual bird you saw, he may listen politely, but never really believes you, unless, applying an avian Habeas Corpus Act, you produce the body itself.

Chapman says the Starling was introduced into Eastern North America on several occasions, but did not gain a foothold in the country until an importation of 60 birds under the direction of a Mr. Eugene Schieffelin was set free in New York in 1890. Since then they have become firmly established in the New England States, and have appeared as far south as Alabama and west to Ohio. I understand that a specimen has been reported in Labrador, and this, with the bird collected at Arnprior, marks their farthest north to date. It is to be hoped that the sub-arctic winter of the Ottawa valley may keep us free from any large invasion of them, but they show remarkable hardiness.

The Starling is a favorite bird in Europe, making itself attractive by its familiar habits around dwellings, its handsome plumage, and its destruction of insects. But, like most other imported animals, its character seems to have changed in its new home, and here it is developing all the unpleasant manners and customs of the English Sparrow. It gathers around buildings in large noisy flocks and defaces the architecture with unsightly nests and droppings; and, while it is true that its food mostly consists of insects, at times it is known to cause severe damage to fruit. Worst of all, it is likely to drive away some

of our most desirable native birds that now nest around our houses. Mr. Taverner makes the really alarming suggestion that it may dispossess the Purple Martin, which can withstand the Sparrow, but may not be able to resist the equally aggressive and larger Starling. This would be a loss indeed.—CHAS. MACNAMARA, Arnprior, Ont.

NOTES ON A FEMALE NIGHTHAWK WITH YOUNG.—During the extreme heat wave which passed over Ottawa in July, 1921, a female Nighthawk shifted her two young across the gravel roof of a neighbour's sun-room. From July 3-6, with drooping wings, open mouth, and palpitating throat, she straddled her young, shielding them from the intense rays of the sun. July 7 being still higher in temperature, she moved them before noon a distance of about four feet to a shaded area cast by the projecting roof over an adjacent attic window. At 6 p.m. she had re-shifted them to their original position. July 8 was still very hot, 95.5°, and at noon she had shifted both young to the extreme side of the sun-room roof, some ten feet, to the shaded area of a brick chimney. At 6 p.m. she had again returned with her young to her original site. At all times, when observed throughout the day, she appeared to be suffering from the heat, in all probability intensified by the gravel coating of the roof. The young were about half-grown and unfortunately the female was not observed in the act of moving her charges.—C. E. JOHNSON.

STRANGE BEHAVIOUR OF A FEMALE YELLOW-BELLIED SAPSUCKER.—A pair of Yellow-bellied Sapsuckers were tapping a maple tree, the male about twenty feet from the ground, and the female some distance lower down. A friend collected the male bird, which remained caught among several small twigs. The female did not fly at the report but disappeared on the opposite side of the tree and began climbing up. Arriving at a point just below the suspended male, she reappeared, uttered excited notes and promptly pounced upon the carcass. The body was dislodged and she hurtled the entire distance to the ground with it, continuing to administer blows and leaving it only when we had approached to within four or five feet.—Ottawa, April 17, 1922, C. JOHNSON.

PARASITE IN A SALAMANDER.—On April 23, 1921, while I was overturning boulders along the edge of a small creek near Ottawa, two specimens of Two-lined Salamanders *Eurycea bislineata* were exposed. One of these had the tip of its tail amputated. When it was immersed in alcohol later, a species of roundworm similar in color and thickness to those found in grasshoppers was noticed protruding nearly a quarter of an inch from the mutilated tail-end.—C. JOHNSON.

The Canadian Field-Naturalist

VOL. XXXVI

OTTAWA, ONT., SEPTEMBER, 1922.

No. 6

A BIOLOGICAL RECONNAISSANCE ON GRAHAM ISLAND OF THE QUEEN CHARLOTTE GROUP

BY CLYDE A. PATCH.

AT 6.30 a.m. on June 21, 1919, in company with Mr. Harlan I. Smith, Archæologist, Victoria Memorial Museum, the writer left Prince Rupert, British Columbia, on the tug *Point Gray*, an oil burner engaged by the Munitions Board to tow spruce rafts from Massett Inlet to the mills at Ocean Falls. We arrived at Massett Reserve, Graham Island, about 3.30 p.m., where we were kindly received by Mr. Thomas Deasy, Indian Agent, and by Harry Wiah and Henry Edenshaw, Indians.

About 360 Haida Indians make their homes on the Massett Reserve and gain a livelihood by fishing salmon or by working in the salmon canneries. A few Indians plant small patches of potatoes but aside from this they are not successful agriculturists nor could they be expected to evolve in one generation from sea-faring people into tillers of the soil. We camped near the reserve wharf.

It was with true regret that we viewed the main street of Massett Reserve, which forty years ago was bordered with hewn-plank houses and liberally planted with wonderfully carved totem poles on which the eagle, raven, bear, human being, mythical "sea-dog," and the beaver—a design introduced from the mainland—were used as motives. The aboriginal-type houses have been replaced by smaller clapboard dwellings, and only two totem poles remain standing. At the long-deserted village of Yan across the Inlet from Massett Reserve several poles are still standing, and also several burial posts. These burial arrangements consist of two sections of log perhaps four feet in diameter and ten feet in height, set in the ground a few feet apart. Between the posts a carved and painted wooden box was constructed in which, from time to time as deaths occurred, bodies enclosed in smaller boxes were placed.

At intervals along the brow of the beach in front of the Massett village lie—cracked and disintegrating—the once cleverly hewn and painted canoes, which have been discarded for motor and row boats. These canoes, hewn from a single log, were some-

times made over sixty feet in length, and would carry forty persons. With the exception of Charlie Edenshaw, who is now blind, the expert carvers of gold and silver ornaments—hammered from coins—and miniatureslate totem poles have passed away, and the rich-hued and durable colors made of stone dust and oil for use in basketry and other ornamentation have been replaced by dye and paint. A few of the handsome old cedar boxes, some of them as large as a trunk, with three corners bent and the fourth joined with wooden pegs and made from a single plank still remain, but the grotesque ceremonial masks and rattles and the picturesque hats woven of spruce bark have disappeared. I believe that within the next decade the true "oldtimers" will have passed on to the Happy Hunting-ground, and the Haida Indian and his works on Graham Island will be archaic.

New Massett with an all-white population of about seventy-five is three miles up the Inlet from the reserve. Excepting the grassy flats several square miles in area which border Delcatla Inlet, a branch of Massett Inlet, and are partly inundated at high tide, the vicinity of Massett is heavily forested. A wagon road connects Massett Reserve and New Massett, and from the latter place a road about a mile in length runs through to the north beach which, at low tide, is two and three hundred yards in width. Excepting at high tide the sea-packed sand of this beach makes a splendid roadbed for traffic between Massett, Tow Hill and Rose Spit.

On July 27, we moved camp to the bank of the Hiellen River at Tow Hill twenty miles from Massett. The three heavily wooded sides of Tow Hill, which rises to an elevation of about four hundred feet, are steep-sloping, while the seaward side is an almost perpendicular rock face protected at the base from sea erosion by a spray-washed point of solid rock. From Tow Hill several wagon roads with an aggregate length of about eight miles have been built, but some parts of them, owing to disuse, have become obstructed with alder growth and fallen timber. Human, cattle, and

bear trails form a network through the forest and across the muskegs from Tow Hill to the east beach and north to Rose Spit. While camped at Tow Hill we explored this area, about one-third of which is lakes and muskeg and the remainder forested with hemlock, Sitka spruce, red cedar, yellow cedar (rare), lodgepole pine, yew (rare), alder, crab-apple and willow, and has as an undergrowth huckleberry (both blue and red), salmon berry (both red and yellow), and sallal. The sallal, a rank-growing shrub attaining a height of four or five feet, covers large areas of the forest floor, and through it progress is almost impossible. In the dense portions of the forest the fallen trees are shrouded in moss, and the living ones festooned with moss and ferns.

No aquatic animal life was observed in the shallow lakes, and excepting the yellow pond lily there is very little plant life. The moss covered muskegs are studded with lodgepole pine, dead and living, and dotted with muck holes which gurgle under the weight of the passerby. In places the muck is eight feet or more in depth and the largest tree can be rocked to its roots bedded beneath the water-soaked blanket of moss which stretches and sinks a foot under one's weight. Except for the geese which roost there and an occasional bear or crane, there is very little animal life on the muskegs.

The Hiellen River, shallow and rapid, in a gravel bed, is inhabited by Dolly Varden trout, sculpins or "bull heads," as they are called by the settlers, and, during the spawning season in September, by humpback salmon.

Over the area explored there are dotted perhaps two dozen log cabins all abandoned but five, the builders having, after three or four years' residence, found the natural conditions too unresponsive to hard labor. The present settlers have each a herd of thirty or so head of cattle, which, with the aid of a small amount of slough grass hay, forage for themselves throughout the year, and, along with his garden for home use, net the settler a living.

Solid rock at the point which stands above high tide, with low rock pinnacles and seaweed covered boulders forming the central portion, and wooded at the base, Yakan Point, situated two miles west of Tow Hill, extends a quarter of a mile out into the sea.

Strewn with driftwood above storm tide, Rose Spit (Rose Point) is simply a barren, tapering ridge of sand several miles in length which continues several miles farther as a treacherous sandbar under the sea.

During the greater part of our stay the weather was clear and cool, a rainy period seldom lasting more than three days. There were a few black-flies, mosquitoes were not uncommon, and the tiny "no-see-em" flies were abundant and very annoying.

On September 12 we returned from Tow Hill to New Massett, and about 7 a.m., September 28, boarded the S.S. *Prince Albert* on her way up Massett Inlet to Port Clements, returned to Massett for freight (saw very few birds up the inlet) and left again at 3.30 p.m. Arriving in Prince Rupert at 1 a.m., we boarded the S.S. *Prince Rupert* and landed in Vancouver at 4 p.m., September 30.

As will be seen by the appended list, the avifauna of the northwest portion of Graham Island is varied and abundant. In addition to those here listed a number of additional species have been observed by other collectors, and as there are mainland islands less than thirty miles distant almost any mainland species may be expected. Three birds inhabiting Graham Island have been described as specifically new to science, and there are indications that others will be found peculiar to these islands. No butterflies have been recorded from the Queen Charlotte group, and neither have snakes, turtles, lizards, salamanders, or frogs; the only cold-blooded vertebrate other than fishes being the toad common to the west coast. An Easterner quickly notes the absence of such familiar mammals as the squirrels, muskrat, hare, foxes and woodchuck. Thus far only eleven varieties of native land mammals have been recorded from Graham Island, four of these being bats. Of the eleven varieties at least six have been described as species or subspecies new to science. The Indians when asked how the mammals got on the island replied to the effect that their ancestors brought representatives of each species. Perhaps they did, either accidentally or intentionally.

As caribou existed on Graham Island and the foreign deer seem to be thriving, the advisability of introducing other game mammals would seem worthy of consideration.

The specific annotations and titles for the list of birds were supplied by Mr. P. A. Taverner, Ornithologist to the Geological Survey of Canada.

MAMMALS

Orcinus orca. KILLER WHALE (?).—Chief Harry Wiah said that two years prior to our visit, while picking strawberries near Chown Point on the north beach, he saw more than thirty seals come on the beach, and, lying as flat as possible, refuse to be driven into the water. Harry claimed that a whale had pursued them and they were thus avoiding him.

RED DEER.—About two years prior to our visit a buck and three does were introduced from some mainland park. The buck became so vicious that his destruction was necessary. Members of our party observed the three does, a spike buck and a fawn. These deer were seen first near Massett and later near Tow Hill.

Odocoileus columbianus subsp.? BLACK-TAILED DEER.—Mr. Carpenter informed me that dead deer are sometimes washed up on the beaches, and during our stay at Tow Hill he observed one near Rose Spit but it was carried away by the sea before I could secure the skull.

"WILD CATTLE."—The so-called "wild cattle" were the descendants of some Short-horn stock that was brought to Graham Island about thirty years ago, by a man whose name is said by Mr. Dave Rutten of Massett to have been "Alexander." For several years, during the absence of the owner, these cattle were neglected and allowed to roam at will. When an effort was made to round them up on Rose Spit they broke away, and after several further unsuccessful attempts to capture them had been made, they were abandoned by the owner. Up to two years prior to 1919 when the last animal is believed to have been killed, the settlers shot these cattle at every opportunity for meat. One of the settlers is said to have captured a cow and a heifer calf, which are believed to be the only wild cattle taken alive. Owing to the fact that the wild bulls sometimes associated with the settlers' cattle, individuals in the settlers' herds show relationship to the hardy, wild Short-horns. The greater part of the foregoing information was given to me by Mr. Cecil Baker of Tow Hill.

Rangifer dawsoni. DAWSON CARIBOU.—None of the Indians with whom we came in contact had heard anything relating to the caribou of the Virago Sound district since the 1910 expedition of Mr. Francis Kermode, who saw tracks of what he thinks may be the surviving individual of the four caribou seen by Indians in 1908 when the three specimens in the British Columbia Provincial Museum were taken.

Mus norvegicus. NORWAY RAT.—I shot a two-thirds grown specimen in the cabin at Tow Hill.

Peromyscus keeni. KEEN MOUSE.—Ten specimens were taken in the forest near Massett Reserve. A jay was observed to capture a half-grown specimen.

Ursus carlottæ. QUEEN CHARLOTTE BLACK BEAR.—On July 10 a female specimen measuring 57 inches in length was purchased from Indians who took it on the beach between Virago Sound and Massett Inlet where accompanied by two cubs said to be large enough to shift for themselves, it was feeding—Henry Edenshaw said—on insects found under the sea-weed strewn on the beach. Bear tracks were fairly common in the vicinity of Tow Hill and on several occasions bear tracks and scattered leaves indicated that bears feed on the roots of skunk cabbage. During our stay at Tow Hill a large bear was chased along the road back of the Hill by Cecil Baker's dogs. During the winter

preceding our visit several bears were taken between Rose Spit and Tow Hill.

Lutra canadensis subsp.? LAND OTTER.—Chief Harry Wiah told me that during the winter of 1918 he trapped seven otters on the west side of Massett Inlet.

Putorius haidarum. HAIDA WEASEL.—Mr. Cecil Baker informed me that nearly every inhabited cabin harbors a weasel, which is unmolested because of its ability as a mouse catcher.

Mustela nesophila. QUEEN CHARLOTTE MARTEN.—Chief Harry Wiah said that during the winter of 1918 he trapped twenty-one martens on the west side of Massett Inlet.

Lutra lutris. SEA OTTER.—I found a sea otter skull in a deserted cabin near Rose Spit. Chief Harry Wiah said that about a year before our visit an Indian shot at a sea otter which was resting on kelp near North Island. He also said that about thirty years ago his father, his wife's father, and other Indians—a total of nineteen boats—got twenty-one sea otters in a forenoon and six in the afternoon.

Eumetopias jubata. STELLER SEA-LION.—A young male, the only specimen observed, was taken on Yakan Point.

Phoca vitulina. HARBOR SEAL.—Twenty or so seals were frequently observed on or near the sand bar on the east side of the mouth of Massett Inlet. Seals were also seen resting on the point of Rose Spit. (Under "Killer Whale," see reference to seals and whale.)

Sorex longicauda elassodon. QUEEN CHARLOTTE SHREW.—Three specimens were taken in the forest near Massett reserve where they inhabited the same localities as *peromyscus*.

Myotis sp.? BAT.—Bats were several times observed at Tow Hill.

BIRDS

Aechmophorus occidentalis. WESTERN GREBE.—On September 5, eight birds were observed just off the rocky point at the base of Tow Hill.

Colymbus holboelli, HOLBOELL GREBE.—Near Rose Spit, on August 1, I observed twenty-eight birds of this species a hundred yards or so off shore.

Gavia imber. LOON.—Both adults and birds of the year were observed. Two, three or four were usually seen a hundred yards off shore in the course of a day's walk along the north or the east beach. No individuals were observed on the lakes visited.

Gavia stellata. RED-THROATED LOON.—A few individuals were observed in Massett Harbour and in the vicinity of Yakan Point. "Charlie" Spence of Massett informed me that this species breeds on Lumme Lake.

Cerorhinca monocerata. RHINOCEROS AUKLET.—Fairly common in Massett Harbour. Adult, Massett, July 17.

Ptychoramphus aleuticus. CASSIN AUKLET.—The remains of three birds of this species were found on the top of Tow Hill, where they had been carried and partly eaten by the falcons. One pair of wings, July 28.

Brachyramphus marmoratus. MARBLED MURRELET.—Not infrequently observed in Massett Harbour, and less frequently about Yakan Point. In Massett Harbour they were several times seen in companies of two. Massett, July 5, July 10. "Both in dark mottled plumage."

Cephus columba. PIGEON GUILLEMOT.—Fairly common in the mouth of Massett Inlet. No birds of the year were observed.

Larus glaucescens. GLAUCOUS-WINGED GULL.—Two or three hundred adults and birds of the year were frequently present about Massett Reserve, Yakan Point and Rose Spit. Mr. Edward Hodgson, 2103 Fernwood Road, Victoria, B.C., informed me that gulls nest on Jacac Island which lies northeast of Graham and is near Dundas Island. He said that gulls also nest in great numbers on Grass Island on the west coast. Juvenile, Rose Spit, August 1; adult, Tow Hill, August 7. "The juvenile is at least a year old, as shown by the wear on the feathering, and is in full moult. However, the incoming plumage seems that of a bird of the year, being more like the first than what would be expected as the second winter plumage. The old plumage, including primaries and tail, is very worn and ragged, and bleached pale. The incoming plumage on the back is almost solidly dark, showing very little of the vermiculation of the juvenile. This looks like a case of arrested development, and an approximation to a reproduction of a juvenile plumage when a more mature one should ensue. This may sometimes occur in subnormal birds, especially amongst the gulls. The adult specimen seems about normal."

Larus argentatus. HERRING GULL.—Less common than the Glaucous-winged Gulls with which they mingle. Three specimens, Rose Spit, August 1; Tow Hill, August 7. "Except 14102, the remains of the passing plumage are very greatly worn and faded, as if it had been retained considerably beyond its proper time for replacement. I think this is likely true of most of the summer Herring Gulls on this coast, as on Lake Erie, that have not repaired to their more northern breeding grounds. None of these birds has the grayish wing-tips of *thayeri*, but what black tips are indicated are pure and deep like those of *argentatus*."

Phalacrocorax pelagicus robustus. VIOLET-GREEN CORMORANT.—Not uncommon in Massett Harbour,

and a flock of forty or fifty frequented Yakan Point and vicinity during the day and spent the night on the small ledges of the perpendicular, seaward face of Tow Hill. The chief food is probably sculpins. Tow Hill, August 7, "much worn and faded"; Tow Hill, August 7, "moulting"; Tow Hill, August 7, "mixed ad. and jv. plumage."

Mergus sp.? MERGANSER.—Seldom observed until September, when two flocks of eight and eight-ten were observed, both on salt water and all in gray plumage.

Lophodytes cucullatus. HOODED MERGANSER.—Eleven individuals were observed on the lakes. None of them were adult males. Juvenile, Tow Hill, August 9.

Anas platyrhynchos. MALLARD.—Fairly common. More frequently observed as the season advanced and the young birds began flying. Cecil Baker, residing near Tow Hill, informed me that this species breeds back of his cabin on a muskeg which contains several small ponds. Massett, September 12.

Nettion carolinense. GREEN-WINGED TEAL.—First observed on August 21, and shortly after appeared abundantly, particularly in the lee of Yakan Point, where flocks of 200 and 300 were seen. I also observed it on Silver and on Mica Lake, and it is said by the settlers to frequent the rivers. Juvenile, Silver Lake, August 21.

Dafila acuta. PINTAIL.—Three female or immature specimens were observed near Tow Hill, September 5. Tow Hill, September 5.

Harelda hyemalis. OLD-SQAW DUCK.—From July 27 to September 5, a total of five birds was observed in the vicinity of Yakan Point. One of these was within easy gun shot, but as we had no boat it could not have been secured.

Oidemia americana. AMERICAN SCOTER.—From July 30 to September 5, a male bird, probably the same individual, was three times observed near Yakan Point in company with White-winged Scoters.

Oidemia deglandi. WHITE-WINGED SCOTER.—Common in water adjacent to all the shore line explored. During the latter part of August the moulting period was apparently in full swing as the beach was frequently littered with feathers. I observed an adult male which had moulted all of the primaries and, as the new feathers were only about one-fourth grown, was unable to fly. Massett July 5. "Old plumage very much worn and faded."

Oidemia perspicillata. SURF SCOTER.—A flock of six was observed on August 7, near Yakan Point.

Branta canadensis subsp.? GOOSE.—Fairly common on the rivers, lakes and muskegs. On August 21, fully 150 were seen on Mica Lake, which is about a mile long by an eighth of a mile wide. The

settlers not infrequently find nests. Silver Lake, August 21; Mica Lake, August 22; 3 specimens, Tow Hill, September 2. "These specimens are very dark below but do not seem to be quite referable to *occidentalis*."

Olor sp.? SWAN.—Mr. Ronald Curry, living near Silver Lake, told me that nearly every spring and fall these birds visit the lake in small parties; the largest that he had observed numbered fourteen. Mr. James Martin, merchant at Massett, informed me that he had seen Swans during the summer months on the lake at the head of Massett Inlet just east of McClinton Bay.

Ardea herodias fannini. GREAT BLUE HERON.—One or two individuals were usually observed in the course of a day spent about Massett Inlet or the small inland lakes. The chief food is probably sculpins as the birds frequented localities where these fish were plentiful. Juvenile, Massett, July 1. "Clearly *fannini*."

Grus sp.? CRANE.—On several occasions their weird cry was heard after night-fall at Tow Hill, and on September 5, two birds were observed out of gun range on a small muskeg near Lumme Lake. The settlers informed me that the cranes are very wary, and that they frequent the muskegs. "Without specimens the identity, whether Sandhill or Little Brown Crane, can only be surmised. The former, *G. mexicana*, is the geographical probability."

Gallinago delicata. WILSON SNIPE.—On September 22, nine individuals were observed on the flats bordering Delcatla Inlet.

Pisobia maculata. PECTORAL SANDPIPER.—On September 20 eighteen birds were observed in small parties scattered over the grassy flats bordering Delcatla Inlet. The local settlers call this bird "Jack Snipe." Three specimens, Massett, September 20; Massett, September 26.

Pisobia minutilla. LEAST SANDPIPER.—On August 9 a solitary specimen was collected on the rocks at the foot of Tow Hill, and on August 21 an individual was observed on the beach near Tow Hill in company with Western Sandpipers. Juvenile, Tow Hill, August 9.

Ereunetes mauri. WESTERN SANDPIPER.—Seen on the beaches throughout our stay in flocks of from eight to three hundred. Individuals of the species were seen in company with Sanderlings and with Semipalmated Plover. Two specimens, Massett, June 25; seven specimens, Massett, July 5. "Though these are all adults, variation in color and size of bill is evident."

Calidris leucophæa. SANDERLING.—During August and September, several flocks, the largest estimated at 400 individuals, were seen on the beach

between Yakan Point and Rose Spit. This species was sometimes accompanied by Western Sandpipers. Five specimens, Rose Spit, August 1. "These are all adults with breasts quite strongly reddish."

Totanus melanoleucus. GREATER YELLOW-LEGS.—Two specimens were observed and collected in the shallow margin of Silver Lake, on August 21. Two specimens, Silver Lake, August 21.

Heteractitis incanous. WANDERING TATTLER.—On August 25 and September 5, flocks of five and seven respectively were seen on the beach near Yakan Point. Two specimens, Tow Hill, August 25; three specimens, Tow Hill, September 5. "All in juvenile fall plumage."

Actitis macularia. SPOTTED SANDPIPER.—From July 27 on, several individuals and parties of three or four were observed near the mouth of the Hiellen River. All were juveniles. Juvenile, Tow Hill, August 7.

Charadrius dominicus fulvus. GOLDEN PLOVER.—On July 27, two individuals, one of which was collected, were observed on the north beach between Skonun (Chown) Point and Yakan Point. Massett, July 27. "This is an adult in not quite full plumage, changing into winter. The old plumage below consists of black and white feathers both much worn and apparently of equal age. The new is considerably more fulvus than comparable eastern birds. On the back the spotting of the old plumage is faded to nearly white whilst the new is a full, pure golden."

Agialitis semipalmata. SEMIPALMATED PLOVER.—Individuals and small flocks were seen on the north beach between Massett Reserve and Rose Spit. On June 24, I observed at intervals along the north beach about three miles from Massett Reserve, eight birds which appeared to be four mated pairs. By voice and action they endeavoured to draw us away from the sandy, driftwood-covered flat where they probably had eggs or chicks. On August 30, I collected a bird of the year at Silver Lake. Two specimens, Massett, June 25; Rose Spit, August 1; Juvenile Silver Lake, August 30.

Aphriza virgata. SURF-BIRD.—Three individuals were collected on the rocks and the beach in the vicinity of Tow Hill. A specimen taken August 21 was in company with three Black Turnstones, the other two were solitary birds. Tow Hill, August 2; Rose Spit, August 20; Tow Hill, August 25. "All in full fall plumage. (Juveniles?)."

Arenaria interpres morinella. RUDDY TURNSTONE.—On September 5, three birds were observed on Yakan Point in company with eight Black Turnstones. Tow Hill, September 5. "Adult in full plumage."

WINDOW-PANE VISITORS IN YARMOUTH COUNTY, NOVA SCOTIA

BY E. CHESLEY ALLEN

BEYOND the western shore of the lake the outline of the forest stands out jagged and dark against the sunset sky, and with the dying evening breeze the mirrors, that have been forming in the little coves, creep forth and grow until they cover the lake's broad surface, and throw back in faithful detail the wooded margins beyond.

The bird chorus has ceased, save where from the dead top of some tall spruce the White-throat's crystal song floats out across the clearing, or high in the air the Nighthawk catches himself on vibrant wing.

The shadows deepen. The dark green of the firs is turning to black, and the ferns of the forest floor become lost in the deepening shadows. Now little is distinct but the white ghostlike trunks of the birches. The twilight birds have ceased; and the only sound is the long, weird wail of the Loon echoing from the lower lake.

We retreat to our little cabin, and a lamp is placed in the long, low window. Almost immediately, from out the mysterious recesses and long dark aisles of the forest, there come to our window panes strange troops of fairy-winged creatures, large or small, of many colours, plain or gaudy, but each after its own kind bearing the stamp of nature's infinite and inexhaustible beauty.

The first to arrive is a troop of tiny moths, so tiny as hardly to be recognized as moths. They alight on the pane closest to the bright light, and circle rapidly about and among each other in a puzzling series of gyrations, like whirligig beetles on the surface of some quiet pool. Move the lamp up or down, or from side to side and they follow its bright lure, but never cease that tireless, mazy dance.

Now the gay figure of the tiny dancer is broken for a moment as a great brown body bounds against the glass and is gone. But it has not gone far. Out there on the edge of the light it stops and poises over the tempting horns of the honeysuckle—a beautiful trim hawk moth, (*Hyloicus kalmiae*). Just below, over another cluster of bloom, hovers a relative, (*H. gordius*), dressed in sober black, white, and gray. It is these moths that are so often mistaken for Hummingbirds, as they poise on their mazy wings over the fragrant flowers; but the hawk moths fly only at dusk or later, when the tiny wings of the Hummingbird have been folded for the night. Later in the evening other hawk moths will come to our window—*Darapsa pholus* in a livery of rich brown and tan, and *Sphinx geminatus* with a

double spot of blue set amid the rich rose-color of each hind wing.

Let us turn again to the window. Up in the corner of this pane a "plume-wing" has settled, and holds her odd little wings as straight as if the first duty of a "plume-wing" was to form a perfect capital T.

Down here on the sash a pale green may-fly has settled, and there, scuttling across the glass is fierce dobson. Both have come up from the lake, and tomorrow we may find still clinging to the side of our boat, or to the stones along the shore, the empty tell-tale cases that these winged creatures have left as evidence of their one-time lowly life beneath the water.

Now, fluttering against the glass, is a most beautiful pattern of pale yellow and rose pink—the Rosy Dryocampa. When we look upon the beauty of a creature like this we can more than half forgive the green striped caterpillar that disfigured our maple last summer.

In sharp contrast to the fair beauty of Dryocampa is this next dark-robed visitor. *Ctenucha* seems at first to be clothed in black, but closer observation shows her robe to be of rich dark brown, the hind wings and body covering forming an underground of deep metallic blue. As if to relieve the gloominess of so sombre an attire her head and shoulders are decked in rich orange.

Here, one after another in quick succession, come a whole troop of gay crocus geometrids, (*Xanthotype crocataria*), the rich deep yellow of their wings spotted and blotched with bronzy purple. The geometrids do not blunder against the glass like some of the heavier moths, but flutter down out of the night like falling leaves, poisoning their wings above them like airy butterflies. Others follow. Here a beautiful little "beggar moth," (*Endule mendica*), with iridescent transparent wings. There a "scallop-shell", with wings barred in finest alternate lines of brown and white. Still others come Geometrids with pale green wings; with wings of creamy yellow crossed by one dark line; or with wings bearing intricate lace-like patterns of black and white.

During a momentary pause a beautifully mottled being strikes sharply against the glass and falls fluttering to the ground. Directly it rises and settles upon the window casing. This is *Hyphoraia parthenos*, a rare northern tiger-moth. The fore wings are deep rich brown broken by white spots and the hind wings banded with black and yellow,

reminding one of the "underwings". A rare visitor indeed! But we have scarcely ceased to congratulate ourselves when another unexpected beauty arrives. This is late July, but there against the sash is one who has tarried behind her gay June companions—pale Luna. Ah! well may she be called the "queen of the night"; for of all the gay procession no creature can excel her for the dainty refinement of her pale green jewel-set apparel, bearing its delicate train.

Far into the night the fairy pageant continues, and reluctantly we darken the light that lures to us these winged gems of the forest.

A strange touch of mystery there is about this infinite nightly tide of living forms from which a small side current is turned for a moment by the lighted window of a little cabin. Whence its source? Whither its goal? In answer to the first we stumble across stray fragments of evidence. This afternoon we were sitting by the gnarled roots of an old yellow birch. As our eyes wandered lazily over the brown and yellow pattern of last year's fallen leaves, they involuntarily became focused upon a fragment of colour of peculiar shape. As we looked closer it transformed itself into a yellow and brown geometrid, resting with wings pressed flat against a rolled leaf. The fresh perfection of its wings led us in curiosity to unroll the leafy cylinder, and there, within, we found the newly broken pupa case. Here this bit of perfect beauty had escaped through fall and winter the bustling search of the migrant sparrows, and the prying eyes of the brown wood mice. The other day we lifted a loose flat stone, and there, firmly fixed to its lower

surface, was the brown, furry cocoon of a tiger moth. Or again, from the open end of that tough silky little bag that we raked up with the brown leaves had come a brown-winged Polyphemus

And whither? To mate, and lay their eggs, and die. But not so with all. In the very corner of our little illumined window is a fine spun web of silk, and crafty Arachna sees many a tiny moth and dainty mayfly become hopelessly entangled in her silken threads. And she is only one of a countless sisterhood; for by the tell-tale dew we see that every tree and bush is hung with treacherous nets. A little higher, on the border of the zone of light, dark figures flit back and forth along the level of the eaves. The brown bats have learned that in this artificial twilight is good hunting, and the many-colored wings that strew the ground next morning show that scores of fairy visitors never quite reach the luring light. Others, momentarily stunned by the treacherous glass, fall fluttering to the ground and mysteriously disappear. Does even Mother Earth herself turn traitor to these, her children, and swallow up their fluttering forms? We stoop to look for the last that fell, and find, sitting beneath the cabin wall, dark toads. Those close-shut mouths look innocent enough, though this big fellow in the middle is gulping and swallowing in a rather suspicious manner.

But in the face of countless enemies the tiny eggs of next year's myriad forms are left in quiet pool, on blade of grass and tender leaf; and if we too are spared to come next year to this, our little cot among the trees, we'll greet again the little people at our window-pane.

RAMBLING BY THE GRAND RIVER

BY MARY PETTIGREW

THERE are many lovely places all over Ontario for the outdoor lover to explore and I have had brief excursions through a few of them, but the one district I know best is the Valley of the Grand River, particularly the fourteen miles of its course between the towns of Galt and Paris.

Our home was in Glen Morris, a tiny village halfway between these two towns, and the woods climbed up the hill almost to our back door, so pine branches beckoned and birds called us irresistibly to explore the shadowy, sweet-smelling ravines of the wooded, hilly country along the Valley of the Grand.

It is a country of ravines. You walk across what appears to be a level field, and are surprised to see before you tree tops on a level with your feet. These are growing along the sides of a basin hol-

lowed out in the gravelly soil, and on coming to the edge you look down on a circular amphitheatre full of trees, and usually a pond or marshy spot at the bottom. The slope is easy enough to descend, but it is steep, and it is hard work to climb out again on a hot day. Sometimes the ravines are long and narrow like the valley of a stream, but blocked abruptly at either end by a small hill.

In one place there is a series of five ravines in succession. On climbing out of the first, the ramblers stands on a ridge, looking down into a second, and so on through ravine after ravine, until, climbing out of the last, he stands on the highest ridge and looks down over a level space covered with hazel bushes, young pines, and maples, to the River flowing close in against a high, gravelly bank, down which, year by year, cedars and white

birches are sliding to their death in the spring flood.

It was on this ridge, looking back towards the fifth ravine, that I saw the top of a maple apparently blooming with a gorgeous red blossom, and until the flower took wings and flew away, I did not realize that it was a Scarlet Tanager.

These ridges between ravines are almost solid gravel, and once the turf is broken, the trees commence to slide. On the highest ones, the rambler often finds granite boulders, gray or pink, all carefully smoothed and with rounded edges. One farm near Galt is known as "Granite Hill," and its original owner, with great toil, rolled the boulders off his farm to form a fence, or rather a barricade along the road. Under these alien rocks, when spring comes, Blood Root, blue and yellow Violets, and Trilliums grow.

At the bottom of the ravine back of our house, a path runs along an old watercourse. In spring it is always very dark and silent there. The pines are so thick and the ground is deadened with their brown needles, so we used to hurry through to look for hepaticas on the sunny hill sides. But about the 24th of May, the pale mauve flowers of the wild geranium appear, and the sides of the ravine are fluffy with Meadow Rue and the white foam of Mitrewort. Strawberries ripen in open spaces where the trees have been cut, and last summer one sun-lighted space by a hemlock was haunted by black-winged damsel flies with iridescent green bodies.

The path leads past an old lime kiln with oak ferns among its mossy stones to a swamp full of cedars, cinnamon fern, tamaracks and plumy grass. All the old cedar stumps are overgrown with *Linnæa* Gold Thread, Star Flower, and tiny green Mitrewort. On summer nights, sometimes a western breeze carries the breath of the swamp, a mingle perfume of ferns, sweet flag, and twin-flowers, up over the hills, while Whip-poor-wills are calling. The twin bells of the *Linnæa* and the white velvet stars of the Partridge Berry Vine have the sweetest perfume of any flowers I know.

This swamp is a happy home for butterflies, Silver Spots, Wood Satyrs and Nymphs, and Thistle Butterflies. Along the wood road at the edge of the swamp the earliest butterfly to be seen is the Common Blue. This we used to call the "Hepatica" butterfly, because its wings look like Hepatica petals that have floated away on the wind. Red Admirals, Commas, the Camberwell Beauty, with bedraggled wings at this season, and Tortoise Shells are plentiful too in the warm spring sunshine. In May and June dragonflies dart up and down this road, and the air sparkles with the flash of their shining wings. They are mostly Libellulas, very tame and easy to catch. They would alight on

my hat or shoulder if I stood quite still by their favorite resting places. This road leads down to several open fields along the river, and last June over these fields coursed strong, swift-flying dragonflies that gave the collector a run for his money.

It is pleasant to tramp through this swamp over hummocks and rotten stumps, carefully avoiding watercourses outlined with marsh-marigold leaves, to the River. Here are thickets of grass and sedges up to the shoulder, stunted willow bushes, balm of gilead, and plantations of sweet flag and jewel weed. The trampled mint delights the nose, as you push through these plants to the water's edge, where mayflies, mosquitoes, moths and damsel flies dance over the brown flowing water.

To describe something that has always been familiar is not easy, but you may know my infatuation for the Grand and its valley, when I say that I was disappointed in the St. Lawrence. Not, of course, in the wonderful stream itself, but in the scenery along its banks.

The Grand River has its origin in Luther's Swamp in Dufferin County, but I have never seen the stream until it reaches Elora, where it has made a wonderful gorge for itself, cutting through layers of limestone. The beauty of scenery at its junction with the Conestogo is well known to artists, and also that at Doon, where it winds along a very high, steep bank, not unlike Scarboro Heights, only the formation is more of gravel than of clay. But the bank is cut into crevices, and the rambler looks down over poplars, brambles, sumach and golden rod to the curving river and can watch its silver spirals for miles. On the top of the western bank is Cressman's Bush, the only bit of virgin forest left in the neighborhood. It has been saved from the rapacity of sawmills largely through the efforts of Homer Watson, the artist. While passing under the shadows of these ancient hemlocks and elms, the rambler gets a faint idea of the awfulness of a great untouched forest. In the semi-dark no little friendly wood plants can grow, and it is a relief to come out of the shadow to an open space matted with partridge-vine glowing with scarlet berries.

From Galt on, the bed of the river is limestone, rocky and broken for the most part, but two miles above Glen Morris the formation known as Guelph dolomite crops out in great stretches, level as a floor. Where the current is swiftest this is cut into narrow channels, anywhere from two to five feet deep, and the joyous wader paddling along this level floor with warm, brown water lapping against bare feet, has to watch his step when he comes to the brink of one of these channels, and if it is too wide for a jump, must wander along its edge up or down stream until a narrow place is discovered, or a boulder bridging the channel.

What a paradise the Grand River Valley must have been in the days of the Indians! It should really belong to them yet, for six miles on each side from source to mouth was once set aside by the Government for the Six Nations. In their day the rolling hills were covered with the greatest variety of trees, some of the wonderful stumps of which remain as monuments. There were pines, elms, oaks, maples, nut trees, hickory, butternut, chestnut and beech, also hazel nut bushes. Even yet, the woods give the Rambler a variety of delightful things to eat, maple sap and sap icicles, when the snow begins to melt, then, later, wintergreen and partridge-berries fresh and firm from under the snow. Spring brings pungent pepper-root from the black earth of the swamp, watercresses from the streams, and morels from the meadows. In early summer, the Rambler finds young, golden-green wintergreen leaves, two varieties of wild strawberries and June berries. Then in summer there are black and red raspberries, blue berries and thimble berries, and in the fall, butternuts, hickory nuts, chestnuts and hazel nuts. The Rambler may spend happy afternoons in the fall beside a flat, limestone rock with a heap of hazel nuts or hickory nuts at one side, and a small round stone in the right hand.

So the Indians must have had plenty to eat, for game was also abundant in the Valley—deer, and wild duck, and partridge—and the river and the creeks were full of fish. The river is now polluted by the towns along its banks, but the creeks are still clean, and in the hope of preserving what we have, the outdoor lovers of the neighborhood have formed an Association to protect wild life for three miles on each side of the river, so that birds, small animals, and fish may have a Sanctuary. The protected area will extend from Galt to Glen Morris, I hope, but it is only half way, so far.

The early settlers tell us that originally the river flowed deep and full among its many islands until late July, and that the dreadful spring floods of later years were unknown. The islands were wooded, principally with great elm trees. The ice freshets of many springs have battered against the trunks of these trees, grinding their bark to match-wood, and, one by one, the few that were left when my memory of the river began have fallen, and, undermined by the flood, have been carried away in the turbid torrent. I am mourning two great trees, the last ones, that disappeared from the island under the bridge at Glen Morris this spring. The flood is a wild, foaming torrent, as unlike as possible to the gentle brown stream of the summer, and flows far beyond the confines of its banks. After the waters have abated, I have walked among the trees and noted the cruel marks of the grinding ice cakes, in the torn and splintered bark, higher above my head than I could reach.

Springs of clear, cold water rise all along the river banks. On the east between Galt and Glen Morris are seven springs, one for each mile, so the foot passenger need never thirst even on the hottest day. The Rambler should make it a point to drink at each one when tramping the seven miles. One stream rises under a cairn of petrified stones, and we always call it "Sweet water" because of a fancied taste of sweetness that does not seem to belong to the other six. All these springs are heavily charged with lime and twigs, mosses, and stones touched by the water gradually become petrified.

Besides the seven springs there are two large creeks on the east side, with cresses and water weeds along the edge, where people still fish for speckled trout. I have followed one almost to its source, but the other remains to be explored. At Galt, Mill Creek, a really lovely little river, enters the Grand. It passes through a park, and is guided into several pools where the boys and girls can splash in absolute safety, and in water that is purer than the drinking water of most cities.

There are not so many springs on the west bank, between Galt and Glen Morris, but there is one creek called Glen Burn, which is a great favorite of mine, because it can be followed up to its source in a lake, which we call "Lime Lake". Nearly all the lakes in the valleys of the hills above the river are on the west side. Most of them are the centres of swamps and are gradually drying up. The water is brackish and not fit to drink, and their beds are quicksand or black swamp mud, ideal for waterlilies, arrowheads and bulrushes, but bottomless for anyone who chances to fall in.

"Lime Lake", where the Glen Burn creek rises, is different. Its water is clear and "hard". It is fed from lime springs rising along its banks, and its bed is white lime, also "sinking sand", but you can wade out a long way without danger of being mired. One of its springs rises under a grassy mound, and you can see the water bubbling up slowly through the white lime particles. The last time I was there, an Eglantine bush was in bloom, and the faint pink petals of the sweet briar roses had fallen into the spring, and were drifting down to the lake, little fairy boats, on the clear water.

Besides the lakes there are dozens of ponds which do not dry up entirely except in an unusually dry summer. These are fascinating places all the year, but particularly in the spring. When the first hepaticas bloom, if you kneel on a log and dredge down in the brown water, amongst scum and withered leaves and broken dried grasses, you discover frogs' eggs in jelly, red water spiders, fairy shrimps, water boatmen, and electric light bugs in their aquatic stage, tiny lizards and caddis cases, and damselfly nymphs. Plunging down deeper,

your dredge comes up with dragonfly nymphs butting through the mud. Almost every pond has its own characteristics. In one, the fairy shrimps may be large and red, and in another they cannot be found at all. Some ponds are afloat with empty snail shells, anchored in shoals among the water weeds. Water striders dance, and mosquito larvæ are wriggling in every pint of water. There is an odd little gray shrimp that wriggles in dozens through the mud in every netful taken from these ponds.

Damsel-fly nymphs are to be found very plentifully among the weeds in the Glen Burn creek, also tiny clam shells and newly hatched crayfish. These are little gems with coral claws, and their bodies are almost transparent. In this stream some of the caddis-cases are made of tiny grains of sand and glitter like mica. The caddises I have met have many styles of architecture for their houses, stone, log cabin, stucco, and thatched. In May every stick and stone you lift out of Glen Burn has stone-fly larvæ clinging tightly to it.

I must tell you about one more stream on the west bank. The hill behind it is almost a precipice, and its surface is covered with earth that looks like powdered lime. The material scratched out of the woodchuck's front door looks like the product of an old lime kiln. On this hill streams burst out anywhere and move on to a fresh site at their own sweet will. But things grow just the same, the usual elms and maples, great tall cedars, and a few pines. The ground is covered with velvety leaves of wild ginger, meadow rue, and maidenhair fern. The principal stream is a gusher, and one wet summer, years ago, it carried down a good half of the hill, trees and all, and laid them on the flat limestone floor of the river. In doing this it cut a deep little gorge for itself, and one hot summer we camped there. When the temperature was hovering 'round the '90's, it was always cool in the gorge, and we even enjoyed bathing in the icy water. There is just room for a tent on the bank where the stream leaps to the river, and one night I wakened and heard the stream singing over and over the notes of a clear wild song of its own.

One of the roughest trips known to me is a journey up the gorge of this stream to the great hole left in the hill after the "washout". The water is so cold that you cannot wade in it long, and, clinging to old roots and cedar branches, slipping on the slimy marl, or sinking ankle deep in the cool wet moss, deafened by the sound of the water, you climb up and up, until you see the stream shooting out from the side of the hill like a tiny Niagara. It changes its place year by year. Last summer there were three springs bursting out from different points.

The flowers that grow in the Grand Valley are a delight, from the first hepatica to the last fringed

gentian. In the woods near the more inaccessible lakes there is still Trailing Arbutus, protected by the swamps being so full of water in the spring that it is impossible to get across to the hills where it grows. Blood Root looks very pretty growing among the waterworn limestone boulders, and, later on, trilliums take their place. Last spring in the woods above Glen Burn, the trilliums were like a white sheet, spread among the trees. In June the woods at Glen Morris are full of fringed Polygalas, orchid-coloured, and the Pyrolas, Shin Leaf, and One-Flowered, and in the last week of June I always go to see the Orchids.

The showy Ladies' Slipper grows in a sphagnum swamp that extends for a couple of miles along the base of the hills on the west side of the river at Glen Morris. It is hard to get at, and for anything else the damp sickening heat and the hosts of mosquitoes would keep me away. Old clothes, rubber boots, and a cap tied down over the ears are indispensable, for it is necessary to bore one's way through an entanglement of ancient cedars and tamaracks, over quaking bogs and masses of Skunk Cabbage and Marshmarigold leaves, Torn, splashed, hot, and mosquito-bitten, at last I reach the tall dead tamarack that marks the secret spot. On the rotting rails of an old decayed fence, the Sundew holds out rosy, dew-tipped fingers, and Pitcherplants, with pitchers half full of water, snuggle in the moss. Some years they are in blossom, but usually the maroon-coloured sepals have fallen and only the green saddle is left. At last, by a clump of tiny tamaracks, a white cross gleams, and below it hangs the slipper like a white shell, veined and spotted with pink and purple. Always I stand breathless before the Queen Flower of the swamp, then wander on enchanted from clump to clump of the great orchids and worship the glory hidden in the depths of the swamp. The flowers are always perfect. One year, however, I was horrified to find the slipper eaten away, and to discover snails at this work of desecration.

On the edges of this swamp, I have found the smaller and larger Yellow Ladies' Slipper, but have never seen the Moccasin Flower growing. People bring specimens to Galt from a swamp near Kit-chener, but will not betray the locality even to one who never plucks an orchid.

The Rein Orchis grows here, too, but its spikes of greenish flowers are overlooked in the quest for the Ladies' Slipper. The curved spirals of Ladies' Tresses are found among the stones on the river banks, and along paths through the pine woods I find Rattlesnake Plantain. Once I found Rose Pogonia growing by an old cedar stump in a bog, but it has never appeared again, although I have looked for it every year. The Showy Orchis grows

in a quiet wood on the west bank. The first time I saw it the plants were all in bud, and, not knowing what it was, I dug one up and took it home. When the buds opened I felt sorry for the plant, whose chance to grow on year after year I had destroyed. Another curious plant that I used to find in dark pine woods is the Indian Pipe. Its stem is white and is covered with waxy scales. It has a single flower with a gray, smoky-looking centre, and the plant turns black soon after it is gathered.

All summer long the pageant of flowers passes by, and every year there are more wonderful things to be discovered—new plants, new birds, fossils, mushrooms and insects. Then when at last the cold winds sweep up the Valley and all is grey and blighted except for the flash of Bittersweet berries, the Rambler has happy memories of summer days to warm the cold months when the living things are asleep under snow.

NOTES ON POST-GLACIAL TERRACES ON THE EASTERN AND WESTERN SHORES OF THE GULF OF ST. LAWRENCE*

BY E. M. KINDLE.

THE principal sources of information concerning the Pleistocene beaches of Newfoundland are the papers of Murray, Daly and Fairchild. Murray¹ records the occurrence of elevated marine shells at three localities, the maximum elevation being 60 feet. The observations of Daly² relate to localities on both the eastern and western coasts of the island. Fairchild³ has dealt with the whole subject of Post-glacial uplift in northeastern America and published a map showing by isobasic lines the inferred extent of Post-glacial continental uplift east of Hudson Bay and the upper Mississippi River valley, including emergence of the shoreline around the Gulf of St. Lawrence. This paper includes a letter from Tyrrell on the subject of Newfoundland Pleistocene shorelines.

Bell, Chalmers and Goldthwait⁴ have contributed many details concerning the marine terraces about the shores of the Gaspé peninsula. Recent publications by Twenhofel⁵ and Coleman⁶ have contributed in a comprehensive way to our knowledge of the terraces on Anticosti Island and the southern shores of the Gaspé Peninsula.

During the summer of 1921 the writer made a short excursion inland from the Bay of Seven Islands, which is located west of Anticosti Island, and visited the estuary of the Humber river in western Newfoundland. The observations on Pleistocene geology made during the visits to these two localities on opposite sides of the Gulf will be recorded in this paper.

Through the courtesy of Mr. J. B. Tyrrell, F.G.S., observations made by him at Bay St. George and other points on the Newfoundland coast will be incorporated in the following notes.

Geological excursions which were made by the writer during a brief stay in the village of Curling near the western coast of Newfoundland resulted in finding marine fossils in an elevated Pleistocene sea beach near this point. The bearing of information of this character on the general problem of differential uplift appears to furnish an adequate reason for recording even isolated observations like the present ones.

Curling is located a few miles above the Bay of Islands on the steeply sloping south shore of the Humber River which here occupies a deep fiord valley called Humber Arm. Conditions have never been favourable for the development of striking or typical terraces at Curling. But a small apron-like terrace of gravel composed of slate fragments, is cut through by the railway about one mile west of the town. A thickness of eight or ten feet of this material is exposed in the cut. Along the sides of this cutting north of the highway crossing *Mytilus edulus* was found in the gravel. Several specimens of this shell were found but no other species was met with. The surface of this deposit is about 50 feet above the Curling railway station by aneroid. The elevation of the roadbed at the station is 79 feet above high tide mark according to the Engineering Department of the Reid Newfoundland Railway. The gravels with *M. edulus* are therefore about 129 feet A.T. No indications of a greater Pleistocene submergence than this were observed, but the absence of terraces at higher levels cannot be regarded as evidence against a somewhat greater maximum submergence.⁷

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¹Proc. and Trans. Roy. Soc. Can., Vol. I, pp. 58-76, 1883.

²Mus. Comp. Zool. Harvard Univ., Vol. 38, Geol. Ser. No. 5, 1902; Amer. Jour. Sci., Vol. I, Ser. 5, pp. 381-391, 1921.

³Bull. Geol. Soc. Amer., Vol. 29, No. 2, pp. 187-234, 1918.

⁴12th Int. Cong. Geol., Guide Book No. 1, pt. I, pp. 81, 120.

⁵Amer. Jour. Sci., Vol. I, Ser. 5, 1921.

⁶Can. Geol. Surv. Bull. No. 34, 1922, p. 14.

⁷NOTE.—Daly gives 160' for the highest shoreline at Curling; Amer. Jour. Sci., Vol. I, pp. 385-386, 1921.

Another old sea beach deposit is reported to have been passed through by a well in the town of Curling located on the property of Mr. Baggs. Seashells were found in digging the well, according to Mr. Baggs, at a level of about 40' A.T.

In connection with the observations recorded above, Tyrrell's notes on the terraces of Bay St. George, 45 miles southwest of Curling, and points on the east coast of the Island are of interest. He writes as follows:⁸

" . . . At Bay St. George, west of Stephenville, west coast, the main terrace has an elevation of 100 feet. At Fox Island River, north of Bay St. George, there is a well defined gravel beach at an elevation of 150 feet above the river. From this gravel beach an even plain rises gently and regularly to the foot of the mountains where it has an elevation of 600 feet above the sea. The plain is underlain by hard boulder clay and I could not distinguish any definite gravel beach or shore on the line which I travelled, but I would not say that it does not exist. I am reasonably certain that there is no shore line along the foot of the mountains at the 600 foot elevation.

On the west side of White Bay, east coast, there was an excellent opportunity of seeing the old shore lines on Sops Island where a depression between two ridges of rock is filled with boulder clay. On this Island there is a strong gravel beach at 120 feet, and another at 160 feet, but above that there is no sign whatever of a shore line or of wave action of any kind, though there are excellent places for preservation of a beach if any had ever been formed. I am therefore satisfied that the 160 foot beach is the highest post-glacial shore line on Sops Island.

On Sops River the glaciation was north-eastward down the river from the Long Range Mountains. I am not sure that there was not also a glaciation northward down White Bay itself.

In the vicinity of the City of St. John's, I did not measure the height of the highest shore line, but am satisfied that it is much nearer the 160 foot level than the 575 foot level as given by Daly."

It will be noted that none of the observations quoted above show beaches at a greater elevation than 160 feet. The higher figures in letter quoted by Fairchild⁹ were estimates made evidently without instrumental aids which will explain any apparent discrepancies. The revision of Daly's earlier observations at St. John's¹⁰ by himself has reduced the post-glacial emergence to zero.¹¹

The very large figure given by some early observers for the maximum emergence on the Labrador coast have not been corroborated by the later work on that coast. The surprisingly large figure of 2000 feet reported by Bell¹² for the highest beaches at Nachvak Inlet in north-eastern Labrador has not been verified by the later observations of Daly and Coleman; the latter¹³ gives 430 feet as the greatest elevation at which elevated beaches have been observed on the Labrador coast. The beaches reported by Hind up to 1200 feet in the interior of Labrador are doubtless modified glacial moraines as suggested by Packard.¹⁴ Hind relied much upon the absence of boulders as a criterion of the amount of emergence as the following quotation will show: "The remarkable absence of erratics in the Moisie, until an altitude of about 1,000 feet above the sea is attained, may be explained by the supposition that they may have been carried away by icebergs and coast ice during a period of submergence to the extent of about 1,000 feet."¹⁵ This is about twice the elevation of any Labrador shoreline recognized by Daly.¹⁷ It may be that late valley glaciers may have, in some cases, been responsible for removing the abundant and widely distributed boulders left by the continental ice sheet. This possibility makes the upper limit of boulders a criterion of doubtful value for estimating the total emergence when applied to coastal valleys. The highest shore lines observed by the writer on the Labrador coast are those at West Modeste, north of the Strait of Belle Isle, where two magnificent terraces are developed behind the village. The highest of these stands 500 feet A.T. according to Daly.¹⁶

Certainly none of the terraces seen by the writer near the twenty-odd fishing stations between Blanc Sablon and Indian Harbour approach an elevation of 1000 feet. The only terraces which the writer has been able to measure on the south shore of the Labrador peninsula are those north of the Bay of Seven Islands. The nine-mile railway from the Bay to Clarke City skirts the front of the highest of these for two miles or more. The lower terrace has a height of 155 feet according to a hand level measurement made by the writer's assistant, Mr. R. H. Wetmore. The terrace is composed of blue clay except the uppermost 20 to 30 feet, which is sand. The upper terrace, consisting exclusively of sand, stands according to aneroid measurement, 40 feet above the lower terrace. The town of Seven Islands, opposite the shore end of the nine-mile pulp-wood railway, stands on a sand flat barely

⁸Letter to the writer, December 20, 1921.

⁹Op. cit., p. 227.

¹⁰Bull. Mus. Comp. Zool. Harvard Univ., Vol. 38, Geol. Ser. Vol. 5, No. 5, p. 258, 1902.

¹¹Amer. Jour. Sci., Ser. 5, Vol. I, p. 382, 1921.

¹²Can. Geol. Surv. Ann. Rept., Vol. I, 1885, p. 8 DD, 1886.

¹³Can. Geol. Surv. Mem. No. 124, p. 47, 1921 ed.

¹⁴Mem. Bost. Soc. Nat. Hist., Vol. I, p. 219, 1867.

¹⁵Hind, H. Y., Can. Nat., 2nd Ser., 1, 302 (1864).

¹⁷Amer. Jour. Sci., Vol. 1, Ser. 5, p. 384, 1921.

¹⁶Op. cit. p. 384.

above high water mark, which represents the terrace last uncovered in the district.

Twenhofel¹⁸ reports the highest terrace on Anticosti island observed by him to have an elevation of 442 feet. On the opposite side of the mouth of the St. Lawrence from the Bay of Seven Islands Coleman¹⁹ found the terraces progressively higher toward the west, with a maximum elevation of 434 feet at Ste. Flavie. The 195-foot terrace at Clarke City may not represent the maximum emergence in that district. No higher terraces were seen.

¹⁸Amer. Jour. Sci., Vol. I, Ser. 5, p. 272, 1921.

¹⁹Can. Geol. Surv. Bull., No. 34, 1922, pp. 14-15.

BIDE-A-WEE LOON

BY MRS. E. J. BOAG

EARLY in July, 1922, the writer and family arrived at one of the small islands in Blue Sea Lake for a short holiday.

A pair of Loons had already taken possession of one end of the island. They seemed far more curious than perturbed at the arrival of the humans and would frequently come within ten or twelve feet of the shore, heads on one side, to inspect us.

After a few days of this mutual inspection, we suddenly remembered our camera and decided to try for a snapshot. We rarely saw both members of the pair of Loons at the same time, but were quite content to snap one. Unfortunately fate here played us an unkind trick. The appearance of our camera marked the disappearance of the sun for that day.

Next day I decided to try my luck again and, armed with the camera, went in search of the Loons. There was neither sign nor sound of them in their usual haunt, so, creeping slowly and cautiously, I neared the water's edge where it seemed their nesting place must surely lie. Still no sign of them; but from amongst the bushes near by a continual "cheep, cheep" and yet nothing moving except myself. Finally I located the spot whence came the "cheep, cheep," and there, amongst a few old twigs on levelled ground, was a large grayish-green egg with two large black spots on it. On creeping closer, I discovered that the two spots were portions of the Loon chick,

however, and it is inferred that the Bay of Seven Islands area and the Chaleur Bay region lie on opposite sides of a zone of maximum emergence which has an axis passing near the north shore of the Gaspé peninsula, through Anticosti island, to the north shore of the Strait of Belle Isle where Daly reports a terrace at 500 feet.

Coleman and Goldthwait agree in making the maximum emergence on the south side of the Gaspé peninsula less than half that on the north side. All of the data available concerning the south half of the west coast of Newfoundland place it in the zone of relatively low emergence.

visible through the broken shell.

By the side of this egg was a broken shell indicating that the first-born had arrived earlier.

It was about ten in the morning when I first discovered the egg and not till four in the afternoon did the little one finally emerge.

The parents were still absent, so I put some clam shells of water near the chick and left it, heartily wishing that its parents would come, as no doubt did the chick.

We listened for them through the night; it was windy and stormy and not a sleep-inducing one. We heard their calls from an island to the south of us, but they did not come near us. In the morning I hurried off to see my foundling.

It was still alive but apparently weaker, and much bothered by the flies, so I made a little nest and brought it in this nearer to the house, where we could watch it better.

After it had been given a little stimulant it became decidedly chirpy and our hopes rose accordingly, only to fall later, as, towards evening that day the little victim of parental neglect gave up the ghost.

We could not leave it to the mercies of flies and ants and others of the insect world, so buried it deeply and erected a granite tombstone at the head of the grave, whereon you may read: "In Memory of Bide-a-wee Loon, Born July 11th. Died July 12th, 1922."

LICHEN GROWTH AND SNOW DEPTH

BY W. TAYLOR

I HAVE found in the course of observations made during the last few years that there is an apparent connection between the surface level of the snow which accumulates on the higher mountain slopes

north of Vancouver, B.C., and the point to which the lichen *Usnea barbata*, or "old man's beard," descends on the bark of the trees in the alpine zone.

Systematic measurements here are limited to the

past three years; but earlier sporadic observations are in accord with them, the whole going to show that the average depth to which the snow accumulates on the levels above 3,000 feet can be obtained directly from the average lower limit of this lichen on the tree-trunks. Professor Church has shown that snow densities in the same geographical district at the end of the season of accumulation vary only about 10 per cent. A few determinations of density, or even an assumed density obtained from a nearby district of the same general altitude, taken in conjunction with the average limit of the lichen referred to, may not improbably afford sound information sufficient for the preliminary survey of watersheds.

Usnea barbata is a typical lichen, sub-alpine in character, foliaceous, with a length of about 9 inches, and a light green colour, which blackens with age. It has a fruticose thallus. It fruits in the fall, the fruit consisting of small circular discs about a millimeter in diameter. It entirely covers the trunks and branches of the host trees under favourable conditions. It ranges in altitude from 2,000 to 6,000 feet in the mountain district north of Vancouver. It is partial to open slopes, and does not favour thick stands of alpine timber. With the exception of the yellow cedar (*Chamaecyparis nootkatensis*) it attaches itself to all alpine trees in this district, including the western white pine (*Pinus monticola*), alpine fir (*Abies lasiocarpa*), white bark pine (*Pinus albicaulis*), and mountain hemlock (*Tsuga Mertensiana*).

The indications of snow depth from the height at which the lichen growth begins are unreliable below 3,000 feet on southern, and 2,500 feet on northern exposures. Some care and experience are necessary in obtaining a trustworthy average height at any point, as shade, exposure, age, and condition of trees give rise to differences which must be discounted in certain cases. But this presents no difficulty to an observer with some experience.

Between May 2nd and May 10th, 1921, which was the period of greatest snow depth on the northern alpine slopes here, measurements were made in different places between the 3,000 and 4,000 foot contours. *Usnea barbata* was found to begin 3 feet on an average above the surface of the snow layer. The difference of 3 feet remained constant in dense, thin, and open forest, on grades of varying steepness, and on level rock-benches. The snow depth at 3,000 feet, for example, averaged 8 feet, and the lichen grew to within eleven feet of the ground; at 3,500 feet the snow depth was 15½ feet, and the lichen grew on the trunks to 18½ feet from the ground, while at 4,000 feet, with a snow depth of 21½ feet, the lichen grew down to 24½ feet. This difference of 3 feet between the snow depth and the lichen limit was not departed from at any of the 200 or more trees where the measurements were taken in the first week of May, although the trees presented great variations in species, size, aspect, and altitude.

It is not possible as yet to decide whether the limit of the lichen marks the ordinary maximum depth of snow, the average depth, or a constant difference. The depth of snow on the northern mountains in May, 1921, was about 3 feet less than what is probably the average depth taken over a long series of years, though this greater depth has only been reached once in the last nine years. The very slow growth of the lichen might, however, make it independent of even such slow seasonal changes as this, in which case the beginning of lichen growth may correspond to the average snow depth. But the point seems to be of sufficient practical importance to justify an appeal at this stage to other observers, especially in view of the cosmopolitan character of this lichen. It might also be worth while to direct attention to other species of lichens whose distribution is more limited.

AN INVASION OF COOTS

BY J. A. MUNRO.

LATE October usually sees a gathering of Coots at various points on Okanagan Lake.

These bands, sometimes numbering a thousand or more, remain until spring, feeding over the beds of *Potamogetons* unless a particularly severe cold snap causes ice to form over their feeding grounds when they move south until open feeding grounds are reached. Although rarely shot at or disturbed they are usually on the alert and will not

allow a close approach. Until this winter I had noticed fearless coots on only one occasion. This was at Summerland in the latter part of March, 1918, when a flock of forty were observed feeding over a wide mud flat on the lake shore close to the main street of the village where automobiles and wagons were constantly passing. These birds did not even raise their heads when a vehicle or pedestrian passed within a few yards.

Conditions during the past winter were quite different. There was an *invasion* of coots and when the cold weather came in February, a steady cold that lasted without interruption for six weeks, these birds, contrary to their usual custom, did not move south. "Mud-hens" were reported in large numbers from Kelowna, Summerland and Penticton on Okanagan Lake, from Kalamalka Lake, four miles to the east and from Shuswap Lake, fifty miles north. At Okanagan Landing they were so abundant as to consume practically all the available duck feed; the long stems of *Potamogeton perfoliatus* were stripped of all their leaves with the regrettable consequence that the usual large bands of Redhead did not winter. With the cold weather, ice formed for some distance out from the shore, covering much of the already partly exhausted feeding ground. The coots were in a sad plight. Large numbers gathered along the icy shore by the village where they were fed scraps by the children. These birds became very tame and would come to be fed when called. Indeed, one small girl was so regular with her largess that the bolder birds would scramble into her lap for morsels of food. Sometimes birds froze to the ice during the night in front of the houses of their benefactors and these had to be thawed out with hot water the following morning. The birds that were fed apparently depended entirely on charity for their sustenance and suffered more than those which had not been pauperized. These led a relatively happy existence diving in thirty feet of water for a scant supply of food. When the weather moderated and the ice melted along shore it was expected that the coots would revert to their normal suspicious attitude towards all things human. However, this was not the case. They continued coming for scraps and many spent the entire day walking along the beach or paddling about in the shallow water close to shore. Several small jetties beside the houses on the lake-shore always held their quota of coots, resting placidly in the sun during the intervals of preening. One band accompanied by several scaups was always to be found close to the Canadian Pacific Wharf, and when the boat arrived, usually at eleven a.m., they gathered alongside to wait for scraps and when the deckhands threw out the remains of their lunch the ensuing scramble was a source of endless amusement to the onlookers. Coots walked along the railroad track beside the boat landing in perfect indifference

to the crowd of passengers transferring from the boat to the train, and on several occasions it was necessary to drive them out of the waiting-room. Many birds walked some distance from the water across the frozen meadows at the north end of the lake and others explored the sage brush benches on the west shore. These were "wild" birds and their overland journeys were an indication of the food shortage in the lake.

When Kalamalka Lake froze over in February an excited resident telephoned the Chief of Police that thousands of Mud-hens were dying and "What was he going to do about it?" The wretched birds moped on the ice or floundered about in the deep snow when the last piece of open water closed up and a great many perished. Those that were not too weak or too coated with ice to fly left the frozen lake in the night. A number of these were seen in Vernon about ten p.m., where, bewildered by the lights, several flew against shop windows and one bird ended its career in a public garage.

Conditions at Shuswap Lake were much the same although possibly the casualties were higher. While waiting for a south-bound train at Sicamous Junction on February 24th I walked along the railroad track with the Provincial Police Constable to see the Coots. There was a small area of open water some distance from the beach where a few birds were feeding, but the majority were gathered about the boathouses on the beach or standing in the snow. These had been fed regularly and apparently made no attempt to shift for themselves. When the constable called "*Coot, Coot, Coot,*" they came flying towards him, their great clumsy feet dragging in the snow. A month after I was again in Sicamous and the constable informed me that few Coots had survived. A number of Mallard and Scaup also died during the winter in spite of regular feeding by the Sicamous residents. I was told by a resident that three Mallard frequented his back yard where he was in the habit of feeding them, and after a short time, tamed by cold and hunger, they entered his kitchen fearlessly when allowed to do so. It was estimated by several that five hundred Coots and two hundred ducks, chiefly Mallard and Scaup, had succumbed to the combined effects of cold and starvation during the month of February. It is difficult to understand why these birds did not migrate at the first indication of zero weather, when a flight of fifty miles would have brought them to open water and comparative safety.



LARVÆ OF *PHORMIA CHRYSORRHEA* MACQ. FOUND UPON NESTLING BLUEBIRDS

BY HOYES LLOYD

ON July 4, 1922, Philip Foran and I discovered a Bluebird's nest at his farm five miles west of Hull, Quebec. The nest was in a cavity in a dead stub and was situated about five or six feet from the ground. At this time the nest contained four eggs.

I returned to this nest on July 23, and found the young fairly well grown and feathered. Consequently they were removed from the nest and banded. Two of the four had enlarged tarsi—perhaps twice normal size as indicated by the tarsi of the other two.

This enlargement may have been caused by the presence of fly larvæ which were found attached to the tarsi. These larvæ clung tightly to their host, but when pulled off moved about with agility.

On the next day, July 24, a return visit was made to the nest and all the young were searched carefully for these parasites. Ten were secured, which with the three taken the day before, made a total of thirteen from the four birds.

The larvæ were found on the tarsi again, one on a lower mandible, several between the growing quills on the under side of the wings, and one was attached to a growing quill. Under the birds' wings tiny spots of blood were seen where the larvæ had been attached.

Eleven live larvæ were forwarded to the Entomological Branch, Dominion Department of Agriculture, and fortunately they succeeded in rearing three to maturity. Their report on the matter is as follows:—

DEPARTMENT OF AGRICULTURE ENTOMOLOGICAL BRANCH

Ottawa, August 18, 1922.

Mr. Hoyes Lloyd,
Dominion Parks Branch,
OTTAWA.

Dear Mr. Lloyd:—

In reference to the maggots which you found on nestling Bluebirds, I have much pleasure in informing you that we were successful in rearing three adults from the material you supplied. Dr. Aldrich of the U.S. National Museum, to whom the specimens were sent identified them as *Phormia chrysorrhea* Macq. On referring to Dr. Aldrich's catalogue of the Diptera I find that this genus commonly is found on the young of birds. The species *azurea*, for instance, is found in France and Germany on the nestlings of Sparrows and young Larks, whereas *chrysorrhea* has been taken in Germany on young Swallows.

We have little information on the nature of these insects in our offices; most of the references apply to European literature, it being stated that both these two species are rare in North America.

On behalf of the Branch I wish to thank you very much indeed for your kindness in drawing our attention to this insect and for submitting specimens. I hope that the information contained in this letter will prove of interest to you.

Yours very truly,

R. C. TREHERNE,

Chief, Division Field Crop and Garden Insects.

As the nest was empty on August 1, and as Bluebirds were seen in the vicinity, it is probable that the young were not permanently disabled by the parasites, and were able to fly at the usual time.

My thanks are due the officers of the Entomological Branch for their courteous attention to this matter.

OCCURRENCES OF THE MEADOWLARK IN NOVA SCOTIA

BY HARRISON F. LEWIS.

MANY of the occurrences in Nova Scotia of the Meadowlark (*Sturnella magna magna*) have not been recorded in any publication. Such records of occurrences as have been published are widely scattered. It has therefore seemed advisable to collect as many records of Nova Scotia

Meadowlarks as possible and to publish them in one article, where they may be referred to readily.

The endeavour to collect these records has resulted in the list, given below, in which fourteen Meadowlarks are definitely recorded from Nova Scotia. In the compilation of this list valuable

assistance, which is gratefully acknowledged, was received from Mr. Harry Piers and Mr. P. A. Taverner. The writer would be pleased to learn of any occurrences of the Meadowlark in Nova Scotia which are not included in this list.

1. (Date?) "Very rare. Only a mere straggler. One was shot at Stewiacke."—Downs, A., *Birds of Nova Scotia*, Proc. & Trans., N.S. Inst. of Sci., Vol. VII, p. 166. Halifax, N.S., 1888.

2. A female, much wasted, [was] taken alive by Mr. Flemming, of Sackville, Halifax Co., N.S., Feb. 16, 1889.—*M.S. Notes of Harry Piers*.

3. T. J. Egan got one from Prospect, Halifax Co., N.S., in May, 1890. It was a male.—*M.S. Notes of Harry Piers*.

4. "On Oct. 24th. 1895, a Meadowlark was obtained by Mr. Dickie, of Canning, Kings Co., [N.S.]. The bird is very rare in this province." Piers, Harry, *Notes on Nova Scotian Zoology*, No. 4, Proc. & Trans., N.S. Inst. of Sci., Vol. IX, Pt. 3, p. 261. Halifax, N.S., 1897.

5. A Meadowlark in winter plumage in the Nova Scotia Provincial Museum was taken, according to the label attached to it, at Lawrencetown, Halifax Co., N.S., Oct. 21, 1901.

6. "Meadowlark (*S. magna*) taken at Eastern Passage, Halifax, [N.S.], 28 April, 1905."—Piers, Harry, *Report of the Provincial Museum of Nova Scotia for 1905*, p. 7. Halifax, N.S., 1906. This specimen, which is preserved in the Nova Scotia Provincial Museum, is in breeding plumage.

7. "One taken at Comeau's Hill, Yarmouth Co., N.S., in fall of 1908, Allen, E. Chesley, *Annotated List of Birds of Yarmouth and Vicinity, Southwestern Nova Scotia*, Proc. & Trans., N.S. Inst. of Sci., Vol. XIV, Pt. 1, p. 84, Halifax, N.S., 1916.

8 & 9. Two seen at Weymouth, N.S., Feb. 23, 1911.—Sanders, G. E., *Ottawa Naturalist*, Vol. XXV, p. 104. Ottawa, Ont., 1911. One seen by Sanders at Weymouth on Feb. 26, 1911, and recorded under the reference given above is presumed to have been one of the two seen Feb. 23.

10. "Another at Emerald Island off Shelburne Co., Feb. 20, 1912. This was said to be one of three or four on the island at the time."—Allen, E. Chesley, *Annotated List of Birds of Yarmouth and Vicinity, Southwestern Nova Scotia*, Proc. & Trans., N.S. Inst. of Sci., Vol. XIV, Pt. 1, p. 84. Halifax, N.S., 1916.

11. A male Meadowlark in breeding plumage in the Nova Scotia Provincial Museum was taken, according to the label attached to it, at Eastern Passage, Halifax Co., N.S., Jan. 30, 1914.

12. One was taken [by R. W. Tufts] at Bout Island, near the mouth of the Gaspereau River, Kings Co., N.S., Jan. 7, 1916.—Tufts, R. W., *Notes on the Birds of the Grand Pre Region, Kings Co., N.S.*, Proc. & Trans., N.S. Inst. of Sci., Vol. XIV, Pt. 3, p. 182. Halifax N.S., 1917.,

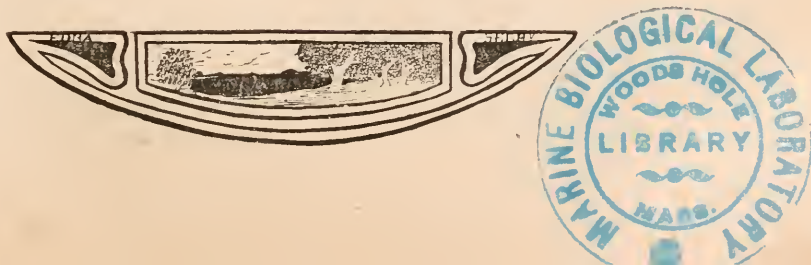
13. A Meadowlark was observed about the Citadel, in the city of Halifax, N.S., on several successive days during the last week in March, 1917, by the writer.

14. A Meadowlark was observed clearly at close range, with X6 binoculars, in a field near the border of a salt marsh, at Central Chebogne, Yarmouth Co., N.S., on Dec. 2, 1921, by the writer. It was in company with a small flock of Robins and a Flicker.

All of the records given are from the central and western parts of Nova Scotia. There are seven winter records, three spring records, three fall records and one record for which the season is unknown, but no summer records. It is evident that the Meadowlark occurs in Nova Scotia only as a straggler.

The bird (No. 13) observed by myself at Halifax, N.S., in March, 1917, was certainly a Meadowlark, but I am in doubt as to whether it was an Eastern or a Western Meadowlark. My attention was first attracted to the bird by its song, which was somewhat like that of the Robin, but which I realized was a song unfamiliar to me. I was at that time already very familiar with the song of the Eastern Meadowlark, but I have never met the Western Meadowlark in the field. Passers-by who heard the song of the Meadowlark at the Halifax Citadel, were heard to remark, "Listen to the Robin." When I finally obtained a good view of the bird I was astonished to see that it was a Meadowlark. The idea that it might have been a Western Meadowlark did not occur to me until some time afterwards.

I have examined carefully the three specimens (Nos. 5, 6, and 11), preserved in the Nova Scotia Provincial Museum, and have found them all to be Eastern Meadowlarks (*Sturnella magna magna*).



BOOK REVIEW

SOME USEFUL AUSTRALIAN BIRDS. *Walter W. Froggatt*.*—It is of great interest to those on this continent who are endeavouring to further the cause of Wild Life Conservation to learn of the similar activities of our enterprising brethren in the Antipodes. The publication treated here should go far to create an interest in the birds and it is obviously impossible to protect them without that interest. This work is profusely illustrated with copies of the figures in Gould's *Handbook of the Birds of Australia*, reproduced by the three-colour process, and this alone should serve to extend the value and influence of the work to both young and older readers. The illustrations are placed through the text, certainly a more convenient plan than having them all bound in at the back of the book and thus separated from the related text on each species.

After a preface concerning this publication and its forerunners, there is an Introduction of fifteen pages. The writer considers that the protection of the native fauna must start from an economic basis, and he shows that once this is appreciated the sentimental reasons for protection will receive sympathy. The danger of protecting injurious species is given mention.

A resume of the history of bird protection in Australia is given under a general heading and under sections relating to the work of protection societies and to the influence of literature. The present protective act is said to give complete or partial protection to all birds or animals not black-listed. The law includes a description of all sanctuaries. For enforcement, dependance is placed upon police officers and honorary rangers. Bird protection among the school children is furthered by "The Gould League of Bird Lovers," founded in 1910. "It was John Gould who did in Australia what Audubon had done in America," and it is indeed fitting that both great ornithologists should have their names kept green by bird conservationists.

There is then a chapter devoted to the administration of protective measures. Lessons are drawn from experiences and practices in the United States and Hungary, where, it will be remembered, the Central Office for Ornithology was ordered by the Minister in 1906, to present a scheme for the supply of nest-boxes to the State forests, com-

prising 5,000,000 acres. The author is hardly accurate in saying that the United States and Hungary are the only two great agricultural countries that have taken up the protection of birds in a practical manner. The Province of Canada passed an excellent law entitled "*An Act for the Protection of Insectivorous Birds, and Others Beneficial to Agriculture*," in 1864 (Chap. 52, 27-28, Vict.) and the Province of Ontario passed a valuable law entitled "*An Act for the Protection in Ontario of Insectivorous and Other Birds Beneficial to Agriculture*" in 1873 (Chap. 45-36, Vict.). Further, in educational work, Ontario was far advanced twenty years ago. The publications of Mr. C. W. Nash in this connection can hardly have been known to the writer of whom we are speaking. In 1904 the third edition of his *Birds of Ontario in Relation to Agriculture* was published, and he is still actively engaged in bird conservation work after more than half a century's devotion to this cause. Other Provinces in Canada have also been active and Ontario is referred to particularly, because past conditions here are more familiar to the reviewer, and because it is one of the older Provinces.

It is odd to find a bird writer in 1921 referring to a few isolated flocks of Passenger Pigeons nesting in the Michigan woods—a statement that is at least thirty years out of date.

Reference is made to the history of bird protection in other countries; Germany, Austria, Hungary and Great Britain are referred to chiefly in this connection.

The usual arguments are advanced in favour of the creation of bird sanctuaries. Prominence is given to the Yellowstone Park in connection with the preservation of the Buffalo—Canada and its Buffalo are not mentioned, although the greatest herd of Buffalo in the world is here. There were more than 6,000 individuals in this herd at the time of the last count. Nor is mention made of the enormous areas of wild life sanctuaries in Canada, the significance of which, in furthering wild life conservation is scarcely appreciated.

It is enough to cheer the hearts of bird lovers and ornithologists the world over, however, to read of the great steps under way to preserve the wonderful fauna of the Australian Continent. This gains new significance when it is remembered that our sister Dominion has now the mandate for great areas outside Australia proper, including Papua and a portion of Polynesia.

Under migration, there is much of interest concerning the Australian area and allied questions

*Department of Agriculture, New South Wales. *Some Useful Australian Birds*. Walter W. Froggatt, F.L.S., F.E.S., Government Entomologist; President, Royal Zoological Society, N.S.W.; Vice-President, Wild Life Preservation Society; Vice-President, Gould League of Bird Lovers; Vice-President, Field Naturalists' Society, N.S.W.; President, Wattle Day League. Price 10s. 6d. Sydney: William Applegate Gullick, Government Printer, 1921. 8vo., pp. 81, 62 coloured plates.

elsewhere. Mention is made of the Migratory Birds Convention in force on this continent.

"The effect of changing environment on the habits of birds" is of special interest with reference to the Australian fauna. Finally we have a discussion of the question of Introduced Species, surely an interesting problem from the Australian stand-point.

Under the groups:

"Birds of the Garden, Orchard and Field,"

"Birds of the Forests and Brushes,"

"Birds of the Inland Plains, Swamps, Open Forests and Scrubs," our author gives an interesting account of the sixty-five species treated. The text does not give descriptions of these, but does furnish attractive life history notes, anecdotes and points concerning distribution.

The book should serve its purpose admirably—namely, to teach about birds and thereby encourage their protection. It will give a good idea of the avifauna of this distant continent to those whose interest in birds is wider than our own confines.—H.L.

NOTES AND OBSERVATIONS

MUTILATED TAILS.—Mr. Johnson's remarks in the March *Naturalist* on the Red Squirrel that had lost a leg recall another interesting fact noted at the same Kapuskasing camp. There were a rather unusual number of Chipmunks (*Eutamias*) on the rocky little peninsula in the river where the camp was situated. A remarkable number of them had lost more or less of their tails. At the time we wondered what might be the cause of this but could arrive at no very satisfactory explanation. Traps seemed the most likely cause, but we could think of no fur trapping in the neighbourhood likely to cut off chipmunks' tails.

The summer of 1920, however, at Last Mountain Lake, Sask., produced evidence that may have a bearing on the subject. A number of Bush Gophers, Franklin's Ground Squirrels (*Citellus*) inhabited the vicinity of our camp and soon became very tame, running around about our feet under the table, over our persons, and up on the table itself. Though perfectly familiar with us, they showed the utmost antagonism towards each other and fought whenever they met. The largest and oldest buck of the community badgered the smaller ones unmercifully. Mr. C. H. Young, one of the party, describes an episode wherein this big fellow crept up on an unsuspecting victim from behind and, suddenly pouncing upon his tail, bit the end clean off. After the fracas, Mr. Young picked up the piece of amputated tail from the ground where the victor had dropped his trophy.

I have seen a number of other stub-tailed Bush Gophers since then and it seems to be a not uncommon result of these struggles for territorial supremacy. Such competition would be more intense in thickly populated stations and probably as great between Chipmunks as between Bush Gophers. Probably the mutilated Chipmunks at Kapuskasing were the vanquished of similar interspecific fighting.—P. A. TAVERNER.

ARCTIC THREE-TOED WOODPECKER (*Picoides arcticus*) IN OTTAWA IN SUMMER.—On August 28, 1922, while I was crossing Carling Avenue where it lies between the city and the Experimental Farm at the head of Fairmont Avenue, an Arctic Three-toed Woodpecker flew over into the sixty-foot border of high trees just within the Farm, having come, probably, from the woods still remaining within the city just across Carling Avenue from the grounds of the Dominion Observatory. As it flew into the border it uttered a harsh *K-r-r-e-k*. In a few seconds it was inspecting the limbs and trunks of some tall young pines, pecking energetically at the flakes of bark in search for the enemies of the trees. I observed it closely with and without binoculars, at one time within fifteen feet. The unbroken blue-black back, the bars at the sides, the long white streak under the eye and down the sides of the neck, the small narrow white streak back from the eye, the white under parts and even the three toes were carefully noted, while the absence of yellow on the crown indicated a female. In five minutes, again giving the harsh call, it flew back into the city towards the woods down Gwynne Avenue. I was astounded on seeing the bird, and am delighted to record herewith a summer appearance of this Woodpecker in Ottawa.—RALPH E. DELURY.

ADDITION TO THE CANADIAN FLORA *Cephalanthera oreogana* REICH.—One lone specimen of this species was found, July, 1918, one mile north of Agassiz, B.C. It was growing in shade on a low hill covered with birch and bracken, southern exposure, in Humid Transition formation. Identified by Dr. C. V. Piper, Washington, D.C.—R. GLENDENNING.

TOM—THE TAME LYNX.—Some eight or ten years ago, I was in St. Flavais, Quebec, and happened to visit the barber shop. One of the two chairs seemed to be vacant, but on my going over to it, a Lynx was found curled up in it.

The Lynx was probably a year old and full grown, I should judge. He was every bit as tame as a domestic cat, liking to be petted, and purring loudly when pleased. He enjoyed being stroked on the chin, but when he stretched out his fore-legs and expanded his massive paws, one at a time, showing his claws to their full extent, while he was seated on my lap, I sat remarkably still.

All the dogs of the village ran away at the sight of Tom.—E. G. WHITE.

CERULEAN WARBLER (*Dendroica cerulea*) NEAR OTTAWA.—On May 14, 1922, as I entered the tall hardwood bush beyond Manotick, about 22 miles along the Prescott Highway from Ottawa, I heard at a distance of about 80 yards a Warbler's song new to me. I hastened through the woods and found the songster moving about in the tops of high basswood and beech trees. The song was fairly loud and required about three seconds in delivery. It was written down as—*zee-zee-zee-zee-zee—tah-ree*, the five uniform *zee*'s requiring half the time. The *tah* was lower and the *ree* higher in pitch than the *zee*'s. As the leaves were not fully developed, I was able to make a thorough observation of the bird with the aid of 8X binoculars. Almost immediately the narrow bar crossing between the pure white throat and the white breast was seen and then the other markings of the Cerulean Warbler were observed: the two white wing-bars, the white edging on the tip of the tail, the two or more dark lines down the side under the edge of the wing, a light strip over the eye bounded by a dark line on the edge of the crown, one or more dark lines on the back near the wing, and at times the bluish upper parts were glimpsed—especially when, on two occasions, the bird swooped down to lower levels, chasing a Black and White Warbler. With the male were one or two females moving about in the same manner and having the characteristics of the female Cerulean as nearly as I could determine. The rarity of the record led me to make a most thorough examination of the bird at intervals for over an hour, at noon in bright sunlight, and the bird sang on during the afternoon in nearly the same part of the woods. The plate by Fuertes in Eaton's *Birds of New York* depicts the bird as I observed it, while descriptions of the songs quoted by Chapman in his *Warblers of North America* are very like my remembrances of the song. There can be no doubt about the record—new to me, as apparently it is to the Ottawa district. However, it was a mere accident that I visited this woods, and I cannot but feel that the Cerulean Warbler would be found more frequently if searched for diligently.—RALPH E. DELURY.

GOLDENEYE BREEDING NEAR OTTAWA.—An adult female Goldeneye with four half-grown young was observed on July 22, 1922, on the Ottawa River, at the edge of the marsh above Cumberland, at a point 16 miles by canoe below Ottawa. The young were closely grouped about the mother, who floated low in the water, hoping to escape detection. As the canoe quietly approached them they increased the speed of their swimming away from the marsh. They were closely observed with the aid of 8X binoculars and were approached to within 100 feet, when the mother with broken squawks plainly told the young to "beat it," and being well schooled, they promptly did so, with wings and feet making good speed away from us and circling back behind us to the marsh. The old bird fluttered above the young, between them and the canoe, squawking signals continuously. The young appeared very dark above, with light edgings on the sides and eyes. The old bird was more closely observed, having the large brown head, short neck, thick dark body, white edging patch on wing and "golden" eye. The bill seemed indented above about one-quarter of its length from the tip. It is highly improbable that it could be other than the American Goldeneye. Adult and juvenile American Goldeneye were seen by the writer during August and September, 1903, at Go Home Bay, about 17 miles up Georgian Bay from Penetanguishene. These are the only two instances of the breeding of this species in Ontario that he has observed. Eifrig's 1910 list does not note the breeding of the Goldeneye in this district, and apparently the present is the only record of young Goldeneyes for Ottawa, though I understand from Mr. Hoyes Lloyd that a breeding female has been taken.—RALPH E. DELURY.

ADDITION TO THE FLORA OF CANADA.—A fruiting specimen of an unknown shrub was sent to the writer in July, 1922, by Mr. G. Fraser of Ucluelet. The plant is *Myrica californica*, California Myrtle, a relative of the Sweet Gale, *Myrica Gale*, and, so far as catalogues show, has not been recorded from Canada before.

Mr. J. W. Thompson, of Tofino, Clayoquot Sound, reports that the shrub was first discovered on his property, about four miles from Tofino, by Mrs. Thomas McBey of Cameron Lake, in September, 1920, and that it has a very limited distribution so far as known.

A good description with illustrations may be found in Sudworth's *Forest Trees of the Pacific Slope*, p. 209, figs. 83, 84.—C. F. NEWCOMBE.



QUEEN CHARLOTTE ISLAND WOODPECKER
Dryobates villosus picoides

The Canadian Field-Naturalist

VOL. XXXVI

OTTAWA, ONT., OCTOBER, 1922.

No. 7

SOME NOTES ON THE SOOKE FORMATION, VANCOUVER ISLAND, B.C.

BY IRA E. CORNWALL, F.G.S.

ALONG the southwest coast of Vancouver Island several exposures of Tertiary sandstone are known, representing at least two formations. One of these, the Sooke formation, is exposed at several places between Becher bay and Sombrio river. The largest area of this formation lies in the basin drained by Tugwell, Muir and Kirby creeks, extending for about three miles along the coast. It faces the Juan de Fuca Strait, and has been traced for about three miles inland, where it has been found at an elevation of over 1,000 feet. It rests unconformably on the Metchosin basalts and Sooke gabbro. The sandstone is covered by a considerable thickness of Pleistocene glacial deposits, clays, sands and gravel. The general dip of these rocks is toward the shore, where wave action has cut into them forming cliffs, which at many places are undercut forming shallow caves.

The first systematic collection of fossils from this formation was made by Dr. C. F. Newcombe, of Victoria, in 1894 and 1895. Collections were also made by the Canadian Geological Survey.¹

About half a mile west of Muir Creek the sandstone forms the beach and has been cut into small table-like projections, some of which are a few feet and others several yards in area. These are caused by the sea cutting through a thin, hard layer of sandstone lying on a softer layer, and are from six to twelve inches high. On the part of the beach uncovered only at the lowest tides are found the sea-urchins, *Strongylocentrotus purpuratus*, in cavities which they cut in the vertical sides of these tables. They do not cut deeply into the rock and become prisoners for life, as do some of the urchins on the California coast, but the holes are cup-shaped and just deep enough to cover them. According to A. Agassiz they cut these cavities with their teeth, gnawing at the rock as they incessantly turn around, thus enlarging the cavities as they grow. These little tables, or projections, are also honeycombed by the rock boring *Pholas penita*. These creatures commence their borings when very small and when they have once made a cavity they become prisoners, only

their long siphons projecting from the holes. They cut into the rock by constantly turning by means of their foot which projects through a large opening between the anterior edges of their valves. It is the edge of this opening which does the cutting, or scraping, as the creature turns. When the *Pholas* has reached its full size this opening is closed by the growth of the shell. When broken, the rock is found to contain fossil mussels, *Mytilus* sp., in great numbers and in a beautiful state of preservation. There are also occasional leaf impressions, some of which show a reed-like leaf with three parallel longitudinal ridges, while others resemble oak leaves. In a piece of sandstone broken off from below low-water mark at the mouth of Sandstone creek, many of the cavities made by the *Pholas* were found crowded with the long shells of the rock boring *Adula stylina*, as many as six or eight being found in one opening. None of these shells were found in borings which they had made for themselves, but all in the borings made by the *Pholas* whose shells, in some cases, still remained in the holes. Evidently the rock in this locality is too hard for the *Adula* to bore into.

The writer has collected a number of fossil bones at different exposures of this formation, most of which were collected about four years ago from the cliffs and sandstone forming the beach west of Muir creek. Dr. Othenio Abel, of Vienna, has examined photographs and drawings of these bones, and, while unable to give an exact determination, has stated that they are from a species of small tooth whale. He also draws attention to the resemblance between one of the vertebrae and the lumbar vertebra of *Squaledont bariensis*, Jourdan,² from the Miocene of Bulluno in Italy. Another bone about eighteen inches long, he states, resembles, in cross-section, part of the lower jaw of a *Mystacocetan*. We have also found pieces of ribs, part of a scapula, and part of a small skull showing the ear opening. These specimens are too fragmentary to be of any real value, but they indicate what may be found in this formation by long continued search.

Considerable interest is attached to the finding of two *Desmostylus* teeth in the Sooke formation, both of which were collected in the cliffs between Muir and Kirby creeks. The first one was found in 1916, and is now in the B.C. Provincial Museum at Victoria. It was determined by the late Lawrence M. Lambe, of the Canadian Geological Survey, as the first right upper molar of the Sirenian *Desmostylus hesperus* Marsh, of Pliocene age.³ The tooth is considerably worn, and the root is missing. It is composed of two longitudinal

is larger and not so much worn. The length of this tooth is 46 mm.; width: 34 mm.; diameter of largest column: 24mm.; diameter of smallest column: 17 mm.⁴ The root of this tooth is also missing, and the end column broken. The main difference between these teeth and the American and Japanese specimens is that each of the Sooke teeth has a well developed cingulum. There can be little doubt that these teeth represent an older species than *Desmostylus hesperus*, as recent research has shown that this formation is Oligocene

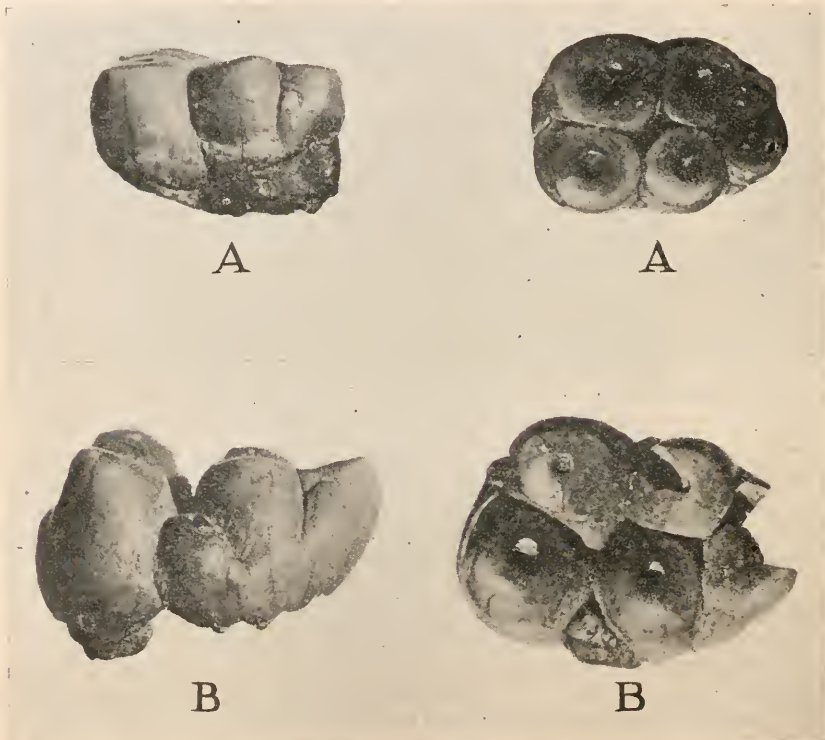


Fig. 1a.

Side and crown views of tooth of
Desmostylus sookensis n. sp.

Fig. 1b.

Side and crown views of tooth of
Desmostylus sookensis n. sp.

rows of appressed columns with a single column at the posterior end. Each of these columns shows the characteristic round pit in the centre. The length of this tooth is 34 mm.; width: 24 mm.; height of columns: 17mm.; diameter of largest column: 15mm.; diameter of smallest column: 10mm. The second tooth was found in 1921 in a large block of sandstone which had been dislodged from the cliff and had fallen to the beach. The number of columns and their arrangement is the same as in the first tooth, but the second tooth

in age, older than any of the formations in which *D. hesperus* has been found.⁵ The only other species in the genus *Desmostylus* is *D. watasei* Hay,⁶ from Japan.⁷ This species is represented by one skull which was collected from sandstone situated some distance above a Miocene deposit. Taking into consideration the greater age of the Sooke formation, and also the presence of cingula on these teeth, they are, tentatively, named *Desmostylus sookensis* n. sp. The specimen in the B.C. Provincial Museum is the type specimen.

Since the first discovery of *Desmostylus* remains by O. C. Marsh in 1888, the exact systematic position of this little-known genus has been the subject of much discussion. Marsh described it as a sirenian, and it was later referred to the *Halicoridæ*.⁸ In a paper by Dr. Othenio Abel read before the Vienna Academy of Science, he states, in part, "That *Desmostylus* belongs neither to the Sirenians nor to the Proboscideans nor to the Ungulates, and indeed is not a placental mammal at all!" He further states, "there can scarcely be any serious doubt left that in *Desmostylus* we have a marine herbivorous Multituberculate."⁹

On the east bank of Kirby creek and about half a mile from the shore the fossil beds are well exposed in the cliffs. Some of the shells from this locality have been determined by Dr. B. L. Clark as fresh, or brackish water species. Two of these are *Cerithidea newcombei* n. sp. Clark & Arnold, and *Goniobasis sookensis* n. sp. Clark & Arnold. A specimen of a very rare coral was also collected at this locality, and was determined by Dr. T. Wayland Vaughan as *Siderastrea vancouverensis* n. sp. This specimen is now in the American National Museum.

Another exposure of particular interest is at Sandstone creek, about three miles east of Jordan river. Here the creek falls over the cliff to the beach, making a fall of about ten feet. There are two more falls quite near the coast, one about a mile from the mouth of the creek and the other about a mile and a half. Below the falls the bed of the creek is covered with boulders washed from the glacial deposits through which the creek has cut. From the mouth of the creek to within a short distance of the first fall the water runs on the surface of the sandstone, which is uncut except for occasional pot-holes and little channels cut at lines of weakness in the sandstone. The two falls do not appear to have been caused by faulting, or by cutting back by the creek, but may have been the result of wave action forming cliffs when the land was at a lower level. This was partly confirmed by the finding of two wave-cut caves, one above the other. These are in the cliffs between Glacier Point and Sandstone creek. One cave is

at the present sea level, and the other is about eighteen feet above it. The formation at this locality consists of alternate bands of coarse conglomerate and brown sandstone.

At almost all places where the base of the Sooke formation is exposed it is composed of conglomerate which rests on the eroded surface of the volcanics. We have only found fossils at one place in the basal conglomerates, which was on a small island in a bay about half a mile east of the mouth of Sandstone creek. Here we found specimens of *Acmaca geometrica* Merriam, and broken remains of *Ostrea* sp., and *Mytilus* sp.

As the Sooke formation becomes better known and more carefully worked it will probably be divided into different horizons, as there is a marked difference in the fauna collected from the different exposures.

As this coast is being rapidly cut away by wave action, and new material is thus constantly exposed it amply repays a visit each year. For several years Messrs. Connell, Downes and the writer have spent a few weeks each summer camping at different points along the coast and collecting specimens. Dr. Bruce L. Clark has kindly determined many of these for us, and some have proved to be new species. These will probably be described by Drs. Clark and Ralph Arnold in the Bulletins of the University of California Publications.

REFERENCES

- ¹Clapp, C. H., Memoir 96, Sooke and Duncan Map-Areas. Geol. Surv. Can., No. 80, pp. 329-340.
- ²Dal Piaz, G., "On Some Remains of *Squalodont* From the Miocene Sands of Bulluno." *Palaeontographia Italia*. Vol. VI, 1900.
- ³Lambe, Lawrence M., *Report of B.C. Prov. Museum*, pp. 42-43, 1916.
- ⁴Q.J.G.S., Vol. LXXVIII, part 2. No. 310, 1922.
- ⁵Merriam, John C., "Notes on the Genus *Desmostylus* of Marsh." Univ. of Cal. Publications, Vol. 6, No. 18, pp. 403-412, 1911.
- ⁶Hay, Oliver P., "A Contribution to the Knowledge of the Extinct Sirenian *Desmostylus* Marsh." *Proceedings of U.S. National Museum*. Vol. 49, No. 2113, pp. 381-397, 1915.
- ⁷Yoshiwara, S., and Iwasaki, J., *Jour. Coll. Sc. Imp. Univ. Tokyo*. Vol. 16, art. 6, 1902.
- ⁸Flower and Lydekker, "Mammals Living and Extinct". pp. 223.
- ⁹Abel, Othenio, "*Desmostylus*, a Marine Multituberculate from the Miocene of the North Pacific Coast Region". Abstract of the proceedings of the Vienna Academy of Sciences. 1922.

BLADDERWORTS OF ONTARIO

By F. MORRIS

MORE than twenty years ago, when I was just on the threshold as it were of a nodding acquaintance with the wild flowers of Ontario, I first discovered the showy blossom-spikes of the Larger Bladderwort (*Utri-*

cularia vulgaris), while I was roaming along the shore of Lake Ontario near Port Hope; they were growing in great abundance on the surface of a small lagoon in the sand. The flowers were decidedly handsome and attractive. It was easy

to see on a near view of them that they must be close cousins to the Figworts (*Scrophulariaceæ*) with their two-lipped corolla subtended by a spur, and it lent added interest to the family to know that the lovely little Butterwort (*Pinguicula*), so familiar a feature of Scotch and English moorland bogs, was their next of kin.

The very same summer what might have proved a mere passing interest was made permanent by the discovery of a second species of these beautiful yellow flowers, a plant of much more delicate habit with a very slender graceful stalk and floating stems of fine-cut clean-looking foliage. I found it in the heart of a sphagnum bog near Newtonville, floating on a pool near some handsome spikes of the Prairie Fringed Orchid (*Habenaria leucophæa*) and surrounded by Pitcher Plants (*Sarracenia*), Beard Tongue (*Pogonia*), and Grass Pink (*Calopogon*). A goodly fellowship, to be sure, and yet, it seemed to me, it was well worthy of its company. I had some difficulty in identifying it, for the book of descriptions—to the tyro—of the Flatleaved Bladderwort and the Lesser Bladderwort are easily confused. It is certainly the former that I have found occasionally since, and I believe I was right in referring my Newtonville find to that species (*U. intermedia*).

In 1901 I went camping on the south shore of Lake Nipissing and in the sandy margin of a bay there, beside our tent, I discovered a very beautiful and highly fragrant spurred flower on a naked scape, which I took to be a bladderwort, but of bladders and even of roots there wasn't a trace to be found. I had no botany with me, and for over a month these specimens of the Horned Bladderwort had to lie hidden in my note book as a baffling mystery along with the Golden Hedge Hyssop (*Gratiola aurea*). Late that autumn I got Mr. James Fletcher, of Ottawa, to help me read these and other botanical riddles, notably one of two years' standing, the now widely distributed Least Toad Flax (*Linaria minor*). To have three kinds of bladderwort on one's calling list, so to speak, was a great satisfaction—childish, of course, but who of us does not envy the child his first meeting with every one of scores of earth's treasures?

More than fifteen years ago, when I paid my first visit to Algonquin, I was delighted to find both the Larger and the Horned Bladderworts abundant in the Park, and as I knew of several bogs near Port Hope where the Flat-leaved species grew, I felt I had always within my grasp that exquisite pleasure of the nature lover, second only to the pleasure of making new friends, that of renewing acquaintance with old.

And so matters stood till some five years ago,

when I ventured, as an annual camper in Algonquin, to master the arts of paddle and portage. "All things come to him who waits", is true enough of the insects, birds and beasts that came to call at our camp on Cache Lake; but there is a race of beings held in durance vile by wicked enchantment. They may not go a-visiting, and these, alas! are the botanist's sole care, the flowers of the field.

Apart from the joy of exploring that the art of the portage provides, treading perhaps where human foot seldom if ever trod, there is this other lure, peculiarly the botanists', that round the very next bend he may make some new discovery in flowers. The very first portage I ever made in Algonquin—only one-quarter of a mile from Cache Lake—brought me what an amateur's vanity delights to think the discovery of a lifetime, a colony of Crag Woodsia (*Woodsia scopulina*), a fern hitherto known only from the Rocky Mountains; and here was I ten feet above level ground and only 100 miles from Toronto, staring at scores of the plants within a few rods of a beaten trail.

My second portage enabled me to cross a little beaver pond above White's Lake, and here in the black ooze of the margin left bare by the shrinking water of an exceptionally dry summer, I caught sight of hundreds of tiny magenta flowers on scapes less than three inches long. Here and there a deer had waded boldly through them to drink, but they fairly defied the foot of man to reach them from shore, or his canoe from the water. I managed at last to outwit these mocking imps with the long arm of a cedar pole, and, cutting off a few stragglers, brought my captives back in triumph to camp.

They were certainly a bladderwort, and, so far, to me a bladderwort had always meant a bright yellow flower; I knew nothing of purple blooms in the genus. A careful study of Gray's botany showed that these tiny dull magenta blooms, set cross-wise on the top of their scape, their lower lip uppermost and the spur remote from the lips, must be the Reversed Bladderwort (*U. resupinata*). Here was a find, indeed; I was now on visiting terms with four species, two rooting in the mud, one purple and one yellow, and two floating in the water.

Next season was a very wet one and the ooze beds of *U. resupinata* were submerged all through August; but the disappointment was somewhat allayed by my finding both *U. vulgaris* and *U. cornuta* growing about the head pools and margin of this interesting little beaver pond.

In 1920, there was a great drought and by the middle of August I knew from the water-level on Cache Lake that a trip to the Beaver Pond would

be eminently worth while. Sure enough, on the farther shore of the pond were great patches of the tiny magenta blooms. After feasting my eyes on them, I came back to the nearer shore and made my way along the side towards the head of the pond; on my way I recognized with pleasure several old friends about the margin: the smallest of our Club Mosses (*Lycopodium inundatum*), the Yellow-eyed Grass (*Xyris flexuosa*), the little Green Wood Orchid (*Habenaria clavellata*), and the Long-leaved Sundew (*Drosera longifolia*). About half way up the shore, as I had anticipated, just out from the firm sandy margin, were dozens and dozens of this quaint little purple mud-dweller (*U. resupinata*). Passing these colonies I found myself presently among patches of that pretty yellow Crowfoot, the pigmy *Ranunculus Flammula*. I had grown so used to this flower that I hardly noticed its blooms, just taking them in with the tail of my eye as I moved along; but while clambering over a pine stump half buried in the sand, I noticed among them a little yellow blossom that somehow seemed different, whether in colour or in form it would be hard to say, but whatever it was it served to arrest my attention, so I knelt to examine the flower closely, and behold! there were two distinct little blossoms among these patches of yellow in the sand, and one of them was a bladderwort. It proved to be the Humped Bladderwort (*Utricularia gibba*); rarely more than one bloom on the scape and the scape not much more than two inches in length.

Last summer's (1921) tropical heat caused such unusual evaporation that at the end of July the watery coverlet had been snatched off these ooze beds, and their occupants roused for their brief revel a month or six weeks ahead of time. But there was no opportunity to do more than race to the landing of the Beaver Pond and back to camp for we were under promise to pack and set out on a week's trip with some friends—paddle and portage—about the Park. Our main course was to be down the Oxtongue to the High Falls and back; but before going south we were to spend two days paddling northwest to the centre of the Park, and here on the very first day of our trip awaited me the surprise of my life in the flowering line.

On Wednesday, August 3rd, we set out by canoe from Joe Lake Station on our way to Big Island Lake and the Otterslides. There were four of us in the party, a congenial couple from Florida in one canoe, and my wife and I in another. Soon after entering the creek above Little Joe Lake, our Florida friends who were just ahead of us sung out that among the large yellow Bladderworts so abundant at the sides of the main channel of Joe

Creek were some purple ones. At first I thought that if the find was a bladderwort it must be the little Reversed species; but we were in deep, open water, and when I paddled up to the spot, judge of my surprise to find myself staring at a large handsome spray of flowers, as sturdy as the Greater Bladderwort and with a somewhat similar scape, three or four blossoms on each, but these, instead of yellow, a beautiful shade of violet, the lower lip having a spot of yellow on its face just forward of where the two lips met and a big stout spur jutting out below it. Long floating stems with crowded whorls of foliage lay in masses on the channel, the sprays of blossom so abundant as to give a kind of luminous haze or blush to the surface of the water.

A few specimens were stowed carefully away into a pocket plant-press, and there they remained for a week, buried (almost lost) under the thronging excitements of a canoe trip. These indeed were so many and great that I had time but twice to think of my find; once, between the Otterslide Lakes, where we discovered a large patch of *U. resupinata*, and again on the last day of the trip when we reached the Beaver Pond and our eyes fell on an army of the Reversed and the Humped Bladderworts drawn up on the margin, its cohorts all gleaming with purple and gold.

Reference to Gray showed that whorled leaves were found in one species only, *Utricularia purpurea*, and an examination of the last three editions of Gray revealed an enticing little problem. Fifty years ago the Purple Bladderwort was known on the Atlantic coast only; thirty years ago, records had been added from Lake County, Indiana; and some twelve years ago it had been reported from points in North Indiana and Michigan. It would be interesting to know in the first place whether the rapidly widening range of stations is due to the plant's activity or only to the activity of botanical research; I mean whether the colonies are newly planted or only newly discovered. In Algonquin the Purple Bladderwort has established itself in several large masses on both sides of the main channel of Joe Creek, and over a distance of about 100 yards, up and down stream. The colony must be at least ten years old, I should judge, and may be much older. If the colonies inland are newly established, it must mean that these plants have come to form the regular food of some water fowl and that their seeds are frequently borne to a distance on web, plumage, or bill (if not in crop).

The extant edition of Gray records it on the coast from New Brunswick to Florida, so it may have taken in the Atlantic Provinces; but I was told it was new to the Dominion; it is certainly

an addition to the flora of Ontario. Moreover, its delicate colouring and the beauty of its blossom make a strong appeal to the æsthetic eye; in

short, it is an "accession" in far more than the Museum sense of the *hortus siccus*.

A NATURE LOVER'S CAMP IN NOVA SCOTIA

BY E. CHESLEY ALLEN

OUR camp fire had burned low. The occasional flare from some crumbling ember set strange uncouth figures struggling with each other upon the canvas of our tent, and drove back to the deep thickets the great shadows that had crept out to reclaim the little spot we had cleared for our summer home. The woods were still, but for the light splash of some furtive night fisherman along the lake shore, or the sleepy fragment of song from some small bird half aroused from its slumbers.

Suddenly from out over the star-lit bosom of the lake rose the long-drawn wail of the Loon; rose, and fell, and died away in receding echoes.

We had come here early in July, milady and I, to this little lake, where an obscure branch of the Tusket broadens out to meet the dense forest growth that clothes the ridges down to its very edge. But with the manifold and hurried duties of preparing a two months' camp before the darkness settled, we had not caught the true spirit of our surroundings until that wild cry came ringing over the water. For the cry of the Loon not only embodies all the freedom, vigor, and exultant passion of the wild life of the north, but is pre-eminently vocal of all the subtle warfare and relentless cruelty of the wilderness; and a fitting prelude it was to the pageant of wild life that we were to enjoy for the next few weeks.

Our camp lay by the shore of the lake, and at the foot of an old log-road that came down from the ridge above. Half way up the ridge this joined another rough road which wound through the woods to the settlement and our nearest neighbors, two miles above. Thither often we tramped, until every tree and shrub and stump claimed a corner in our memories.

Where the roads joined stood an old logging-camp, abandoned for two or three years, and already beginning to show signs of decay.

There is something about an abandoned logging-camp that invites inspection. The wild life that receded before the encroaching axe of the logger, comes back on his departure to take advantage of the artificial shelter afforded by his rough architecture. Swallows and wasps build under the eaves; bats fly at evening about the yawning

doors and windows; and hares and shy wood mice take refuge under its floors.

This particular old camp would have afforded bats' wings enough to clothe Titania's entire train. One day, when we were passing, our attention was attracted by a scratching sound on the side of the building. Seeing nothing on the outside we entered; but there nothing was visible. Coming out again and locating the sound, we lifted a long loose strip of tarred paper with which the building was partly covered, and out flew bats in all directions. A snug hiding-place they had had clinging to the rough wall, with the noonday sun beating upon the black paper over them.

Just above our camp the road dipped into a dark hollow where the broad-leaved striped maples met overhead. Here on several mornings we found the ground strewn with moths' wings of a most delicate blue-green. The explanation was made clear one evening when we were returning to camp. Back and forth under the overhanging trees flitted the bats; and we knew that each quick turn and tack of wing meant the death of a moth.

By day the bats gave place to the dragon-flies. The roadside swarmed with butterflies—admirals, swallow-tails, silver-spots, mourning-cloaks and sulphurs. Among these the dragon-flies were dragons indeed. Coursing up and down the road like a burnished steel shuttle, one would dart at a flitting butterfly, and quicker than the eye could follow, seize it, turn it over, and with its wings placed together keel-like, bear it off to some roadside twig, where in a moment the wings fluttering down showed that the meal had begun. These bold highwaymen were not above cannibalism, for they often seized and devoured members of their own family.

A great black and white hornet that came to our tent for flies, though not so sure of her mark as the dragon-flies, yet made many captures; and most of them were through the flies' own blunders. Entering our doorway she would dart at every dark spot upon the canvas, the flies in the meantime making feints at her, in the manner in which Swallows are often seen to do with larger birds. But, unlike the Swallows, the flies

often flew into the very clutches of their enemy, who caught many more in this way than by her own efforts. Each victim was taken to the ridge-pole of the tent, where the captor, hanging by one hind foot, deftly turned her victim over and over and clipped off its wings, and then made off with it through the doorway. The depository was not far off, for often she would be back within a minute, her lively hum blending with the high-pitched pipe of the cicadas.

Many other insect visitors, welcome and unwelcome, came uninvited to our tent.

A little mason wasp built her mud-walled nest in the corner of our packing-box book-case, but our clumsy fingers destroyed her dainty work before we were aware of its presence.

On the ground outside, however, we had an opportunity to observe the domestic economy of her cousin, a pretty little orange and black wasp. When first observed she was crawling awkwardly along dragging a green caterpillar; which, when the ground was rough, was almost too much for her. Following her laborious journey to a bit of smooth ground near an old dead stump, we saw her suddenly drop her burden and begin to circle about a small area a few inches in diameter.

Presently she stopped and began digging into the soft earth; and after excavating not more than half an inch, she quite surprised us by seizing her prey and completely disappearing with it into the ground. In a minute or two she reappeared alone, and began scraping the earth back into the pit, taking the greatest care to remove all hard lumps and bits of stone. In fact anything but the softest earth was carried away some few inches from her treasure-pit, which was finally levelled to the top, and the whole surface left smooth and free from rubbish.

After her departure we examined the spot; and, removing the freshly placed earth, found at the bottom of the shaft not only the green caterpillar, but beside it a brown one of about the same size, both capable of slight motion but helplessly paralyzed. Deposited carefully between them was an elongated white egg, from which eventually would have hatched a very hungry young wasp larva, ready to devour the food so wonderfully preserved and carefully placed at its disposal.

There is always a touch of mystery about those swarms of innumerable ants, which on certain sultry summer days emerge, and fill the air with the shimmer of their frail wings. For days the preparation for this great event has been going on under many a loose stone, or in many an old stump or soft hillock. But what manner of fiat is this that in some mysterious way goes forth through-

out all the colonies far and near, and which calls forth their swarms as if by prearranged consent.

Throughout one lazy afternoon we witnessed the wedding pageant of the great caterpillar ants. Far and near the air was filled with their dazzling flight. One queen settled upon an old pine stump near our tent, and after a short survey of her surroundings evidently decided that it was the proper place for a home; for in that business-like way in which ants do everything, and as if to show her utter contempt for frivolities, she immediately set about ridding herself of her now useless wings. By a skillful use of her feet, the wings, first on one side and then on the other, were brought forward so abruptly that they were torn short off at the body; not bitten off as one might suppose.

To tell of all the insect wonders to be found about that woodland camp would take many pages. The strangely shaped chrysalids hanging on the thorn that developed into beautiful black and white admiral butterflies; the spiny galls on the witch-hazel from which the big yellow jacket wasps stole liquid sweets; the beautiful blue and green damselflies along the lake shore; the gay parties of silver-spots that danced about the roadside thistles; or the crafty ways of the caddis larva fishermen that stretched their nets in the current of the brook, all beguiled away those dreamy summer days.

But beneath the pleasing rustle of the forest leaves what an underplay of stealthy silent tragedy there is!

In a bank by the roadside a pair of Juncos had built their late nest. Perhaps some accident had overtaken their first attempt at rearing a family, for now in July the mother faithfully guarded her three speckled eggs. At last her vigil came to an end; and three limp awkward nestlings lay in the grass-lined hollow. Next day we visited the spot and found the young gone, and the grass lining strewn about the roadside. Suspicion rested upon the red squirrels who had been rummaging about the spot that morning.

Near our tent lay a large flat stone. A striped chipmunk scurrying across the clearing suddenly stopped and disappeared beneath its edge. The next moment a brown mouse appeared from the other side, and hurried away. Presently the chipmunk appeared bearing something in its mouth which he soon began to devour. Driving him away from his meal we found the head and feet of a young mouse. Another tragedy. But how quickly either squirrel or chipmunk seeks cover or cowers into rigidity when the deep boom of the big Horned Owl comes rolling over the tree-tops. Well do they know and fear the swift,

silent death that ever lurks to overtake the un-watchful among the forest people.

Our camp was in a paradise of birds. Birds were everywhere; on the ridges, in the meadows, up the brooks, and on the lake.

One morning the glassy surface of our cove was broken by long V-shaped ripples. The mother Loon had brought her young close in to the shore; and as we stepped from our tent a pretty sight they were; the snowy breast of the mother gleaming in the morning light, and the two black downy young paddling contentedly along in her wake. Out beyond watched the wary mate; and when we appeared both old birds sent long peals of weird laughter echoing across the waters, and started for the open lake followed by the two youngsters.

Now we dash for the boat. Well we know that the old birds can well laugh at any efforts of ours on the water. But what will these downy babies do? At our first sign of pursuit the male bird immediately dives. to reappear several hundred yards away. But the mother, though swimming some distance ahead of her offspring, remains in sight, and encourages their heroic efforts with loud wavering calls. And strong and steady pulling it takes to lessen our distance from the plucky little swimmers. When, however, it is shortened to a few yards, they separate, one following the mother's calls to the deeper water, the other keeping on up the cove. The latter we follow; and when our boat is almost upon him, flash! he is under. Relaxing our steady pulling to await his reappearance we are surprised to see his tiny head appear an astonishing distance ahead. Not to be outdone in this manner, the next time he disappears we pull steadily, and we are almost within reach of the little fellow as he bobs to the surface. Down again he goes; and away we pull, watching eagerly for that little black head to appear. Second after second passes without a spot on the clear mirror ahead, behind, or on either side of us. Have we carried our experiment too far? Has that mite of wild life become a victim to our curiosity? Away out in the lake the two old birds and their one baby are watching. But what is that dark speck scarcely visible among the sparkling morning ripples that are just beginning to ruffle the middle of the lake? Steadily it approaches the trio out beyond. We can scarce believe our senses! How little we reckoned on that great wilderness instinct, ages old, that had taught the tiny fugitive to double back under our boat and make for the open water, and freedom! Pleased rather than disappointed, we turn toward camp.

Along the lake shore we had another oppor-

tunity to observe the resourcefulness of Nature's children, when hard pressed. A pair of Spotted Sandpipers had nested near our camp, and their soft ascending *pr-r-r-eet* as they circled along the shore was one of the cheeriest evening voices. We often saw them with their young and noted how quickly, when disturbed, the little grey fellows scuttled under the fringe of bushes that lined the beach. One day coming suddenly upon one of them, we cut him off from his usual retreat. Try as he would he could not get by us. Suddenly he made straight for the water, and, dashing boldly in, swam boldly out into the lake with all the ease and grace of a Duck. The lack of webbed feet troubled him not at all. Stepping back we allowed him to approach nearly to the shore when, suddenly stepping forward again, we made as if to seize him. In a trice he was under the water and swimming again for safety. Swimming? Nay, rather flying under water, for now the legs were stretched straight behind, and the unfeathered, paddle-like wings were used as easily as if that was to be their ultimate mission. And in his remote ancestors so, no doubt, it was.

In the dense growth behind our tent the birds were innumerable. The shy Ovenbird's shrill call came ringing down the long green aisles even at midday; but at night we heard his true love song. When darkness was falling upon the slopes, and most of the evening voices had ceased, starting from some high perch, he would rise higher and higher in air, singing all the while, till, the song suddenly ceasing, he dropped abruptly into the darkening woods.

All day long the sweet soliloquy of the Red-eyed Vireo came floating down from the high beeches. What an idle fellow he seems. But find him if you can, up there in the maze of leaves; and in the pauses of his song you will see his gray form ever flitting from twig to twig, and those keen eyes ever searching the under surfaces of the leaves where innumerable insects lie concealed.

For several days near the last of August the slope rang with the music of a little Winter Wren. His song was new to us; and it was only after a long weary scramble over logs and through thickets that we espied his diminutive brown figure sitting atop an old brush heap, and pouring forth his floods of delicious melody.

What continuous delights were those long walks through the woods to the village! The roadsides abounded in Warblers—Yellow, Black-throated Green, Black-and-white, Canadian, Myrtle, Magnolia, and Chestnut-sided; with Maryland Yellowthroats, and Redstarts.

An insignificant but unusual song called our attention to the top of those tall spruces. Some

small bird was hidden somewhere among their tops. Suddenly he came into full view, and the morning sun flashed upon the gorgeous orange throat patch of the Blackburnian Warbler. A meeting with this animate gem is about worth a journey to the north woods.

Farther up the road by a clump of hackmatacks we were stopped one day by a low sweet song resembling that of the Purple Finch, but more Robin-like. Investigation revealed our old red-coated friend of the white winter landscape, the Pine Grosbeak. 'Tis true the books tell us he breeds in the far north; but here in the cool Nova Scotia woods we met him and his sober-colored mate, and day after day we listened to his dreamy love song.

By the green alder thicket near the brook we paused to hear the ringing cadence of the Veery; while farther on, where the road wound by open pasture lands, the mellow golden notes of the Hermit Thrush vied with the clear sweet whistle of the White-throat.

But now the chill nights of late summer were

beginning to weave white mist veils over the sleeping bosom of the lake. The clematis and fire-weed were donning their soft down, and in the open the roadsides were becoming gorgeous in golden-rod and aster. The Warblers and Vireos had ceased their songs of love and were joining the ranks of Chickadees, Kinglets and Sparrows. Already faint voices floating down from the starlit sky told that the great southward movement had begun.

For us, too, came the parting from our summer home, and thoughtfully we looked into that last evening's camp fire. The lake lay like a mirror. Three Black Ducks, circling over the islands, settled above our camp, and swimming down by us left long ripples in its glassy surface. A Blue Heron arose from his fishing in the cove above and flapped lazily away toward the setting sun. Gradually the red in the sky and lake changed to gray; and as the stars came out one by one all was still, save the voice of the distant river and deep, deep bass of the old green frog down among his pickerel weeds.

MYXOMYCETES OF THE LAKE NIPIGON DISTRICT

By F. B. ADAMSTONE, B.A.

DURING July and August of the past-summer (1921), while engaged in limnobiological research on Lake Nipigon the writer spent odd moments making a collection of Myxomycetes or slime molds in the surrounding district.

The region about Lake Nipigon is a very rugged hilly country, most of which is quite densely wooded. Among the hills there are numerous small lakes and streams. The forest is composed largely of balsam, spruce, poplar and birch. It is the last of these, in the form of old stumps and rotting logs, which seems to be the favorite substratum for Myxomycetes, but almost any organic material will serve the purpose. No specimens of slime molds were seen until after the middle of July when the prolonged hot weather was interrupted by rainstorms. Thereafter, when rambling through the woods turning over logs and examining stumps, one was almost certain to come upon some, either in the gelatinous plasmodial stage, or in the form of delicate lacy fruiting bodies. The extraordinary life history of these organisms makes them particularly interesting from a biological point of view.

When the ripe fruiting body is shaken or disturbed, a minute cloud of dust-like particles floats away from it. This consists of the spores of

the Myxomycete. Should the spores fall upon a suitable medium, they germinate, and from each a small naked droplet of protoplasm escapes. These droplets are usually provided with one or more delicate cilia, by the motions of which they are propelled about in the liquids of the substratum. By growth and subsequent division, a whole host of similar droplets is formed. Eventually a time comes when these fuse in pairs, then the pairs coalesce so that a large jelly-like mass of protoplasm results. The plasmodium, as this structure is called, resembles an enormous amœba, not only in its appearance, but also in its streaming movements and in the manner in which it ingests food material. It is very sensitive to external stimuli at this stage, and usually avoids strong light. Living beneath logs or other forest débris. Finally a time comes when its sensitiveness to light disappears, and it comes out into the open sunlight, sometimes being seen as a brightly coloured, gelatinous substance on the side of a stump. At this stage peculiar processes go on within the plasmodium, and as a result small masses of protoplasm are heaped up as rounded globules. The fruiting bodies or sporangia are ultimately formed from these little heaps of protoplasm.

Among the forms collected there are three general types of sporangia which are easily recog-

nized. Nearly all of them, however, are quite minute and occur in small patches on the substratum. On this account, they may easily be overlooked unless careful search is made for them. One of the types of fruiting body most commonly encountered is a delicate, plume-like sporangium of lacy texture, supported by a fine stalk. Another is a very small globular spore case held upright on a fine stalk, while the third is a sessile, globular body which may range in size from less than a millimeter to several centimeters in diameter.

In the collection made at Lake Nipigon there are representatives of twenty-nine species, two of which have not previously been reported as occurring in Canada. The identification of these specimens was very kindly undertaken by Miss M. E. Currie, M.A., of the Department of Botany, University of Toronto, and the writer is also indebted to her for extensive notes relating to each species. The names of the species collected, together with short descriptions, as suggested by Miss Currie, are given below:

1. *Arcyria incarnata* Pers.

Six specimens of this form were obtained, ranging in colour from the typical dark reddish-brown to a pale flesh pink. The capillitium of these specimens is of delicate lacy texture and is attached to a small cup—the whole resembling a small red plume.

2. *Arcyria nutans* Grev. (Fig. 1).

Yellow coloured feathery aggregations of the fruiting bodies of this species were obtained on four occasions. The capillitium is superficially much like the preceding and resembles it closely except for the yellow colour.

3. *Badhamia decipiens* Berk.

This species has not previously been reported for Canada although Macbride in his *North American Slime Molds* records it for New England. The specimen has small, sessile, subglobose fruiting bodies which are sometimes plasmodiocarpous or evenly distributed in grayish yellow masses over the substratum. The capillitium consists of large, orange branching lime knots connected by thin hyaline threads or sometimes by typical coarse, lime-filled threads. The spores are pale violet-brown, minutely spiculate, and slightly paler and smoother on one side.

4. *Badhamia utricularis* Berk.

The sporangia of this species are globular, bluish-coloured bodies attached to the substratum by means of fine, straw-coloured stalks. The clusters of fruiting bodies have the appearance of bunches of grapes recumbent on the substratum since the stalks are not strong enough to support the sporangia.

5. *Badhamia panicea* Rost. (Fig. 3).

Macbride reports this species as purely a western form and this is the first report of it for Canada. The sporangia are gregarious, sessile, subglobose bodies 6-8 mm. in diameter and of a blue-gray colour. The spores are a violet gray colour, slightly paler on one side and minutely spiculate; but more smooth and more violet in colour than *Badhamia foliicola*. The peridium is transparent and thickly dotted with minute clusters of white lime granules.

6. *Ceratiomyxa fruticulosa* Macbr.

The sporophores are very small unbranched white bodies, and, since they occur in clusters, look very much like a mold or fungus growth.

7. *Comatricha typhoides* Rost.

The stalked, plumose sporangia have a brown colour overcast with a silvery sheen, which is due to the remnants of the peridia.

8. *Craterium leucocephalum* Ditm.

Small groups of minute, goblet-shaped, brownish sporangia characteristic of this species were found on dead balsam leaves. The brown colour is often strongly masked by white.

9. *Dictydium cancellatum* Macbr.

The collection of this species is typical having minute, globular brownish-red fruiting bodies supported by short, slender stalks.

10. *Diderma spumarioides* Fr.

The typical sporangia, in this case, are small, globular, sessile bodies of a gray colour. Instead of the usual substratum of birch bark this specimen fruited on a poplar leaf and the sporangia covered both sides.

11. *Fuligo septica* Gmel.

Two collections were made. One, about 1 cm. in diameter, has a pale yellow lime crust over the surface of the fruiting body with large yellow lime knots; the other, 3 cm. in diameter, has a white lime crust with large yellow lime knots. When the spores have been partly shaken out the surface has a peculiar fluffy appearance, which resembles, in miniature, the remains of a wasp's nest.

12. *Leocarpus fragilis* Rost.

The sporangia are brownish, short-stalked, obovoid structures. The peridium forms a rather solid crust over the surface of the sporangium.

13. *Lycogala epidendrum* Fr.

Large globular fruiting bodies of a brownish colour are characteristic of this species and are easily recognized because of their size and commonness.

14. *Mucilago spongiosa* Morg.

The grayish sporgania are grouped in stalked, grape-like clusters arising from the white hypothallus. The lime crust, which is usually present, has disappeared. The aethalium is 8 cm. long and

is spread out over a stick. Froth-like masses of the mold frequently encircle stalks of grass or herbs at a short distance from the ground, the whole having the appearance of the frothy material of the spittle bugs seen on meadow grass in summer.

15. *Physarum compressum* Alb. & Schw.

In the single specimen obtained, the pale gray, subglobose sporangia occur closely crowded together on the substratum, or, in some cases, intermixed with plasmodiocarps, and a few are scattered singly. There are rounded and angular sparkling lime knots connected by thin hyaline threads. The spores are spiculate and slightly paler on one side.

16. *Physarum globuliferum* Pers.

A large specimen was found on a birch stump. The sporangia were of a mauve colour and each consisted of a small, globular spore case supported by a fine stalk. The size of the patch of sporangia was so extensive in this case that the side of the stump on which it appeared had a mauve colour.

17. *Physarum viride* Pers.

The small gathering shows some sporangia with short dark stalks, and some sessile. The peridium is a golden yellow and the capillitium consists of a network of hyaline threads connecting slender, pisiform, orange lime knots. The spores are nearly smooth, 10 microns in diameter.

This gathering is peculiar in that the sporangia are not like the typical form, that is, they are neither nodding on slender black tapering stalks nor are they symmetrically lenticular or subglobose.

18. *Physarum viride* Pers. Var. *aurantium* Lister.

The typical globular gray sporangia, nodding on a fine stalk, are present in this specimen.

19. *Physarum polycephalum* Schwein (Fig. 2.)

This species is characterized by small, grayish lobed sporangia supported by a slender stalk. In the specimen obtained there are sporangia which are lenticular in shape as well as the characteristic type. The capillitium is made up of hyaline threads connecting deep yellow lime knots.

20. *Stemonitis herbatia* Peck.

Three specimens were obtained and these illustrate well its great variability. The sporangia are plume-like networks of brown capillitium supported by fine stalks. One of the specimens has a cluster of ferruginous sporangia 7-8 mm. in height and the spores are almost smooth. Another has fruits 7-8 mm. high, but these are fuscous in colour and the spores are slightly more violet and are roughened with minute warts. In the

third collection the fruits are 4-6 mm. high and the spores and capillitium are typical. The capillitium of each consists of a dense intermediate network ending in a small-meshed superficial net. Specimens of this species were the first slime molds observed. They appeared on a stump in the form of small, round, white bodies which might have been mistaken for the eggs of some insect. During the night the white bodies elongated, their colour changed from white to dark brown and they transformed into the beautiful delicate fruiting body typical of this species.

21. *Stemonitis ferruginea* Ehrenb.

The representative of this species is rather poor but the sporangia are the typical short brownish ones of the plumose kind.

22. *Stemonitis fusca* Roth.

This gathering is composed of a cluster of dark brown plumose sporangia 4 mm. high. The spores are 8 microns in diameter and their surfaces are reticulate.

23. *Stemonitis splendens* Rost. (tentatively).

In this specimen the sporangia consist of long brown plumose bodies supported by a fine stalk.

24. *Trichia decipiens* Macbr.

The collections of this species have dark brownish globular sporangia supported by a fine stalk. The coloration is peculiar, yellow to yellowish-brown being more typical. The elaters are a deep yellow colour and are very similar to some species of *Trichia botrytis*.

25. *Trichia favoginea* Pers.

In this species the sporangia are characteristically bright yellow sessile bodies of elongate oval form.

26. *Trichia persimilis* Karst.

A small mass of densely-crowded, ochre-coloured sporangia make up this collection. The spores are covered with coarse, angular, pitted, wart-like structures which give them an irregular outline.

27. *Trichia varia* Pers.

This specimen was immature when collected and has not the ochre hue of ripe fructifications. The elaters are typical, having two loosely wound spirals, but the spores are thin-walled and irregular in shape.

28. *Tubifera ferruginosa* Gmel.

A typical flat, brownish aethalium 2.5 x 1 cm. was collected. The surface of the cushion-shaped mass of sporangia presents a honeycomb-like appearance where the tips of the sporangia are broken off.

29. *Tubifera stipitata* Macbr.

This species is much like the last except that the sporangia are stalked and the cluster thus raised from the substratum.

A LIST OF SHELLS FROM GODERICH, ONTARIO.

BY BRYANT WALKER

IN the summer of 1921 Mr. A. W. Andrews, the well-known coleopterist of Detroit, Mich., spent his vacation at Goderich and very kindly collected for me such shells as he came across while in the field.

The list, although not large, is of interest as it includes at least one form not hitherto recognized in Canada and extends the range of several others very considerably towards the west and seems worthy of preservation as a local list.

Polygyra albolabris (Say).

Ten fully matured specimens are all rather thin and noticeably greenish in tinge. They vary in height from 16 to 21.20 mm. with an average of 18.18 mm. and in diameter from 23.75 to 29 mm. with an average of 26.7 mm. The axial index varies from .641 to .859 with an average of .684.

A comparison of the average shell of this series with the average shells from the Upper and Lower Peninsulas of Michigan and the Charity Islands, Lake Huron, (Walker, Occ. Pap., Mus. Zool., Univ. Mich., No. 7, 1915, p. 2) may be made as follows:—

Locality	Height	Diameter	Axial Index
Upper Peninsula	17.02	25.81	.654
Lower Peninsula	18.10	27.10	.677
Charity Islands	18.51	26.33	.704
Goderich	18.18	26.70	.684

This shows the Goderich shells to be larger in diameter than those from the Upper Peninsula and the Charity Islands and smaller than those from the Lower Peninsula; but higher than those from the Upper and Lower Peninsulas and lower than those from the Charity Islands.

Polygyra thyroidus (Say).

Rather small, varying from 21 to 22 mm. in diameter and like the preceding species decidedly tinged with green.

Polygyra tridentata (Say).

Rather small, varying from 12 to 14 mm. in diameter and quite depressed.

Polygyra monodon (Rack).

“ “ *fraterna* (Say).

Pyramidula alternata (Say).

“ “ *cronkheilei anthonyi* Pils.

“ “ *catskillensis* Pils.

So far as I can ascertain this is the first record for this form in Canada.

Helicodiscus parallelus (Say).

Mesomphix inornata (Say).

This seems to be the first Canadian record for this species west of Ottawa. In the United States it ranges from New York southwest through Ohio, into southern Indiana. The supposed records from Michigan are either unauthenticated or fraudulent.

Zonitoides minuscula (Binn).

“ *arborea* (Say).

Vitrea hammomisi (Strom.).

“ *binneyana* (Mse.).

“ *lamellidens* Pils.

This rare (in the north) species has hitherto been recorded in Canada only from Ottawa (Walker, *Ottawa Naturalist*, XIV, 1900, p. 90). Mr. Andrews' discovery extends its range very considerably to the west.

Vitrea ferrea (Mse.).

“ *indentata* (Say.).

Euconulus fulvus (Dr.).

Circinaria concava (Say).

Vallonia excentrica Sterki.

Gastrocopta armifera (Say.).

“ *tappaniana* (C.B. Ads.).

“ *contracta* (Say.).

Succinea ovalis Say.

Cochlicopa lubrica (Mull.).

Carychium exile H. C. Lea.

Lymnæa humilis modicella Say.

“ sp.?

A single, very small specimen, probably immature, with a broadly reflected columella that I cannot place.

Planorbis parvus Say.

Physa sayii warreniana Lea.

I think that this is the first record for this form in Canada.

Goniobasis livescens (Mke.).

Pomatopsis lapidaria (Say.).

Amnicola sp.?

A single specimen of a small species that I have been unable to identify satisfactorily.

Sphaerium striatinum (Lam.).

Mr. Andrews reports that he saw no signs of there being any *Unionidæ* in the river at Goderich.

Mr. Justice Latchford states in reference to Dr Walker's paper that he has not had a favourable opportunity to collect shells on his official visits to Goderich, but that once while walking there near the mouths of the Maitland he picked up a living *anodonta* which he thought to be the variety of

edentula known as *paronia*. Attached to it was a small *ancyllus*. Both shells were broken in transit from Goderich.

In regard to *Physa sayii warreniana*, he says that in the opinion of Dr. Frank Collins Baker of the University of Illinois, *warreniana* is a very common shell in the vicinity of Ottawa, and is the proper name of the beautiful pearly *physa* found in Brown's Inlet, west of Bank Street, and in the

Rideau River as well as of the darker form called *heterostropha* in the publications of the Ottawa Field-Naturalists' Club. Dr. Baker has examined large sets of Canadian *physæ* submitted to him by Justice Latchford, and has identified tentatively nearly all of them. Many appear to be new to Canada, and some may be undescribed. A provisional list will appear in an early number of *The Naturalist*.

A BIOLOGICAL RECONNAISSANCE ON GRAHAM ISLAND OF THE QUEEN CHARLOTTE GROUP

BY CLYDE A. PATCH.

(Concluded from Vol. XXXVI, No. 6, p. 105)

Arenaria melanocephala. BLACK TURNSTONE.—On July 21, a specimen was collected near Massett Reserve, and from July 27 on, several small flocks were seen on Yakan Point. On September 5, a flock composed of eight Black and three Ruddy Turnstones was seen on Yakan Point. Massett, July 21; Rose Spit, August 20; Tow Hill, September 5. "The Massett specimen has traces of spring plumage on sides of breast and is therefore adult, the other specimens are probably juveniles."

Hematopus bachmani. BLACK OYSTER-CATCHER.—On July 5, two adults were observed on the rocky shore in front of the old Indian village (Yan) which is located on Massett Harbour about opposite Massett Reserve.

Dendragapus obscurus silkensis. SOOTY GROUSE.—Fairly common. During the moult, which takes place in August and the fore part of September, they frequent the roadways where the sand, which has been used to some extent as road building material, makes desirable dust baths. This year at least large broods were not in order judging by the families observed as follows: 1 female and 6 juveniles; 1 female and 2 juveniles; 1 female and 4 juveniles; 1 female and 2 juveniles. The Indians sometimes catch grouse with a noose on the end of a pole. Ten adult and three juvenile specimens were taken from August 6 to September 21 at Massett and Tow Hill. "These birds are probably referable to the above form lately described by Swarth (*Condor*, 1921, pp. 59-60). The males are all dark birds, the females rather reddish. Most of the males have collars of worn rusty that may be more or less characteristic of Q.C.I. birds, but I am not prepared to say that it is more than fading common to the species at comparable plumage stages or an indication of juvenility."

Phasianus sp.? PHEASANT.—Two years ago Mr. Cecil Baker, living near Tow Hill, released two cocks

and a hen. The following spring a brood was seen near Silver Lake, and again last spring juveniles were observed in the same locality. Mr. Chas. Smith, who lives near Silver Lake, informed me that this spring he saw a cock bird dig young potatoes and carry them into the wood. Possibly this was a trait acquired by an individual, or perhaps the potatoes taken harboured grubs.

Columba fasciata. BAND-TAILED PIGEON.—On July 28, a representative of this species was seen in a tree about thirty yards from our camp at Tow Hill, but before I could get my gun it had flown across the river and by the time I reached its resting place it had disappeared. None of the inhabitants, some of whom are fairly well acquainted with birds, had ever seen the pigeon, of which I showed them a coloured picture. The nearest substantiated record of this species is from Bella Coola, B.C.

Accipiter velox. SHARP-SHINNED HAWK.—Not uncommon. On two occasions this species was seen annoying a party of Jays by darting at individuals when they emerged from the dense evergreen growth, and on another occasion one was seen alternately pursuing and being pursued in a listless manner by several Crows. Six specimens. Massett and Tow Hill, July 5 to August 9. "These are all juvenile birds in very dark plumage and suggest a possible subspecies."

Astur atricapillus subsp.? GOSHAWK.—A bird of the year was secured September 12, that had been annoying poultry in the vicinity of Massett. Mr. Dave Rutten of Massett has a mounted specimen. Juvenile, Massett, September 12. "This is a dark bird with broad, sharp and very dark stripes below and on breast. The ground color is deep cream, almost tawny on the breast. We have one adult of unknown sex from Massett, taken in February, 1920, by W. T. G. Hellier. This specimen is very dark, almost black on crown and back, and

broadly washed with the same color on flanks and across breast. The vermiculation is coarse and suffused, and the feathers below and in front broadly shaft-streaked. Both these types of coloration (juvenile and adult) are included amongst the types of *striatulus* originally described by Ridgway. This is a well-marked form in these specimens, but it is evident that we will have to revise our conceptions of the characters and range of this subspecies. It is not the breeding form of southern British Columbia, where it only occurs as a migrant, and, judging by the number of specimens obtainable, a rare one. It is not characterized by fine vermiculation but shows a general suffused darkness and broad shaft-streaks. There is no evidence that the species breeds on the Queen Charlottes, and the nesting area is a matter of supposition."

Buteo borealis calurus? RED-TAILED HAWK.—Three were observed on the border of the muskegs in the vicinity of Tow Hill. The stomach of the specimen collected contained the remains of several toads. Tow Hill, August 7. "This is a very dark and richly coloured bird. However, it does not approach the black phase of the Western Red-tailed. Below it shows much greater increase or depth of red color, rather than an extension of the black. Hoyes Lloyd has a very similarly coloured bird from southeastern British Columbia, and J. A. Munro says he has seen several birds from the Q.C.I. quite similar to it. It therefore seems to be a rather constant coast type of coloration which we have not seen from elsewhere."

Haliaetus leucocephalus. BALD EAGLE.—Two or three birds were usually seen in the course of a day's tramp. White-marked and brown individuals were present in about equal numbers.

Falco peregrinus pealei subsp. (?). DUCK HAWK.—At least two juveniles and two adults were seen about Tow Hill. Several local residents informed me that they annually nest on Tow Hill's ledges. I found the remains of three Cassin Auklets on which they had been feeding, and on two occasions saw individuals pursuing waders which in both instances succeeded in eluding the pursuer. I was informed that this species is not uncommon on North Island. Two juveniles, Tow Hill, July 28. "Though these are both rather dark birds, they are separated from some eastern specimens only with difficulty."

Pandion haliaetus carolinensis. OSPREY.—Two were observed on the north beach, one on July 27 near the mouth of the Skonun River and the other on September 5 near Tow Hill.

Cryotlax aedica brooksi. SAW-WHET OWL.—After dusk on July 5, a female and three juveniles were collected in the wood bordering the dry creek

bed just back of Massett Reserve, and on the evening of July 21, three juveniles were collected in the same locality. My attention was attracted to these birds by the "saw-whetting" cries of the young. Some of the stomachs contained plumage that will probably prove to be that of some warbler, though it is to be hoped that this will be found to compose only a small percentage of the stomach contents of these handsome little birds. One adult and three juveniles, Massett, July 5; three juveniles, Massett, July 21. "All but one of these are in the juvenile plumage comparable to the *kenicotti* plumage of eastern birds. They are obviously to be referred to *brooksi*, not *scotæa* described by Osgood as from Q.C.I. I should not be surprised to find that this form is deserving of full specific rank."

Otus asio subsp.? SCREECH OWL.—On August 7, I believe I heard two individuals in the wood bordering a muskeg near Tow Hill.

Nyctea nyctea. SNOWY OWL.—I was informed by Mr. Thomas Deasy, Indian Agent at Massett Reserve, that he had twice seen this bird near the reserve, and Mr. Cecil Baker, living near Tow Hill, told me he had shot two of these birds near his place.

Ceryle alcyon. KINGFISHER.—The Hiellen River, Chown Brook, and the vicinities of Massett and Massett Reserve were each frequented by several birds. Massett, September 12.

Dryobates villosus picoideus. WOODPECKER.—About ten individuals were observed during our stay. Four adults and four juveniles were collected at Massett from June 25 to September 22. "These are all well marked *picoideus* in general coloration, though I cannot see the barred-back character called for by Osgood. Most of the white dorsal feathers have centre spots which other members of the species do not show, but I can hardly say that this would be described as cross-barring. The red crowns of the juveniles are more pronounced in the male specimens. In general coloration, especially below, some specimens show individual intergradation with *harrisi*, and even in the spotting of the back feathers the same may be true."

Sphyrapicus ruber. RED-BREASTED SAPSUCKER.—During our stay twelve individuals were observed. On June 30 what appeared to be a family party, consisting of three juveniles and two adults, was collected in a stretch of wood between Massett and Massett Reserve. Five specimens, Massett, July 1.

Colaptes cafer saturator. FLICKER.—Two or three individuals were usually observed during the course of a walk through the more open wooded areas or along the margins of the muskegs. Juvenile, Massett, July 12; juvenile, Tow Hill, September 5; juvenile, Tow Hill, September 6. "These birds,

whilst dark, are somewhat lighter than typical *saturation*, and are also lighter than several specimens from southern British Columbia (V. I.). Neither are they quite pure *cafer*, but all show more or less distinct *auratus* influence. One specimen has the gray throat feathers tipped distinctly with fawn, and small black indications in the red mustache. In none of them is the gray of the throat perfectly pure and without traces of fawn. Since they are juveniles, perhaps too much stress should not be laid on this slight throat veiling."

Selasphorus rufus. RUFOUS HUMMINGBIRD.—Common at the time of our arrival and until July 5, after which time they were comparatively rare. Their disappearance may have been due to the fact that after the first week in July, the sallal blossoms at which they had been feeding began giving place to fruit, and the birds possibly migrated to localities where other food was abundant. Hummingbirds are frequently found dead on the window sills of the settlers' homes out of which they have been unable to find an exit after having been enticed in by the house plants. Three specimens, Massett, July 1-2. "Probably all juveniles."

Empidonax difficilis. WESTERN FLYCATCHER.—Throughout our stay, one to five birds per day were observed in the more openly wooded areas. Four specimens, Massett, July 24 to August 1.

Cyanocitta stelleri carlottæ. QUEEN CHARLOTTE JAY.—Fairly common. Usually moving about in family parties. Frequently seen feeding on green fruit of the Skunk Cabbage which they manage to remove from its stem and carry to a comfortable spot on a trail, roadway or log. On one occasion a Jay was observed to capture a young wood mouse. The settlers sometimes use Jay flesh for trout bait. Four adults and eight juveniles, Massett, June 28 to September 26. "These particular specimens are only slightly different from some northern Vancouver Island specimens, but the Dwight and Bishop collections contain *carlottæ* with strongly marked subspecific characters."

Corvus corax sinuatus. RAVEN.—Present at all points visited. Usually in what were probably family parties consisting of three, four or five individuals. On June 24, a juvenile and an adult male were taken in company. With the beginning of September they evidently congregate in larger flocks, as one day fourteen and another day nineteen were seen winging about the wood at the base of Yakan Point. The Raven appears to get more joy out of life than any other species with which I am acquainted. I have seen two birds, one above the other, drift out of the wood and for a quarter of a mile up the beach in the face of the wind, and every few yards as they drifted the lower bird,

without apparent effort, rolled sidewise completely over. At other times I have seen a bird alight on the beach and make several grotesque hops over the same spot before coming to rest. Adult and juvenile, Massett, July 24.

Corvus caurinus. CROW.—Common in certain localities, particularly on the beaches and in the adjacent woods in the vicinity of Massett and Yakan Point. They feed to a considerable extent on dead crabs, with which the beaches are at times strewn. A nest, discovered June 28 and containing three juveniles just able to fly, was situated five feet from the ground in sallal growth. Juvenile, Massett, June 28. "Too juvenile to identify specifically, but included under this species on the general probabilities."

Pinicola enucleator subsp.? PINE GROSBEAK.—Only three individuals observed. On July 5, I was unable to find a wounded male first seen on the beach east of Massett Reserve, and two days later I failed to collect a pair observed in heavy timber near Massett.

Loxia curvirostra minor. CROSSBILL.—Abundant. Flocks of 50 or so were not infrequently observed extracting seeds from the spruce cones. The song of this species, usually emanating from a solitary individual resting in the top of an evergreen, was frequently heard throughout our stay. Three specimens, Massett, June 25; Massett, July 1. "13998 is mixed gold and orange plumage, the former predominating; 13999 olive with indistinct yellow and orange veiling; 14000 olive; 14028 gold, orange and red about equally present."

Spinus pinus. PINE SISKIN.—Apparently not common, as it was observed on only three occasions as follows: June 25, three individuals; July 7, fifteen; and July 21, two. One juvenile and two adults, Massett, June 25. "The juvenile is just out of the nest, indicating breeding in the vicinity."

Junco hyemalis oregonus. JUNCO.—Fairly common in the more open areas. During the last week in July and thenceforth they were usually observed in flocks of from 15 to 30 individuals. A juvenile just able to fly was collected on July 8. Massett, June 24; Massett, July 8; Massett, September 20.

Melospiza melodia morphna. SONG SPARROW.—Fairly common in the shrubbery contiguous to the beaches. Juvenile, Massett, June 25; two specimens, Massett, September 20. "These skins have the appearance of being very large, but as the tails, wings and bills do not seem to be appreciably larger than those of other *morphna*, this is probably due to the fresh, unworn, fall plumage and to 'make up'. A large series from the islands would be desirable."

Melospiza lincolni. LINCOLN SPARROW.—Not uncommon. Frequents the muskegs and the flats

bordering Delcatla Inlet. During one day twelve individuals were observed in the vicinity of Silver Lake. It appears to be a rather shy species usually seen making quick, short flights from cover to cover. Tow Hill, August 4; four specimens, Silver Lake, August 21. "The only difference I can see between these and eastern birds is a slight increase in the weight of the dark crown streaks. It is too fine a distinction, however, to found or name a subspecies upon."

Passerella iliaca subsp.? FOX SPARROW.—Shy and not abundant, only six or eight being observed, usually in dense undergrowth. Two specimens, Massett, June 24; Massett, September 20. "These are very heavily coloured birds which I do not wish to identify until I can go over the whole species with care."

Hirundo erythrogastra. BARN SWALLOW.—Not common. One or two birds could usually be seen about Massett Reserve. On July 7, ten adults and four nests were observed about an unoccupied house on the flat near Delcatla Inlet. One nest contained eggs while the others held nestlings of various ages. Later in the season nests in which broods had earlier been raised were found in abandoned shacks situated in small, isolated forest clearings. August 24, a flock of twenty-four adults and juveniles was observed near the base of Yakan Point. Three juveniles, Tow Hill, August 7.

Iridoprocne bicolor. TREE SWALLOW.—Fairly common in the vicinity of Massett Reserve from the time of our arrival until our departure for Tow Hill where none were observed. Juvenile, Massett, July 3.

Vermivora celata lutescens. ORANGE-CROWNED WARBLER.—This warbler is probably better represented than any other as about twenty-five individuals were observed. They were several times seen in company with Chickadees. On July 5, two juveniles accompanied by an adult male were collected. Adult and two juveniles, Massett, July 4; Tow Hill, August 15. "These are all good *lutescens*."

Dendroica townsendi. TOWNSEND WARBLER.—About eighteen individuals were observed during our stay. In September they were seen in company with Chickadees, Kinglets and Brown Creepers. June 25, juveniles were observed being fed by the parent birds. Two juveniles, Massett, June 25; Tow Hill, September 5.

Wilsonia pusilla subsp.? WILSON WARBLER.—Only four were seen, all in the vicinity of Tow Hill. Tow Hill, August 9; Tow Hill, August 15. "I have not quite decided whether these are *puleolata* or *chrysolea*. They do not seem obviously typical of either."

Nannus hiemalis pacificus. WINTER WREN.—A few individuals were invariably observed in the undergrowth along the roadways. Juvenile, Massett, June; Massett, July 1. "Plainly *pacifica*."

Certhia familiaris occidentalis (?) BROWN CREEPER.—Only a few individuals were observed during our stay. This species was several times seen in company with Chickadees, Kinglets and Warblers, where its presence was apparently distasteful to the Chickadees, as they frequently darted at it with angry twitters. Adult and three juveniles, Massett, July 4. "*Occidentalis* seems the form Ridgway ascribes to the humid coast, and that is the form Osgood refers his Queen Charlotte Islands specimens to. The one adult in this lot does seem perceptibly browner above and below than eastern birds and those from the southern interior of British Columbia, but the difference is not marked."

Sitta canadensis. RED-BREASTED NUTHATCH.—Not common. A total of thirteen individuals was observed in the vicinity of Tow Hill. Four specimens, Tow Hill, August 1. "These birds are an unusual bright and even reddish below."

Penthestes rufescens. CHESTNUT-BACKED CHICKADEE.—Fairly common. Flocks of this species were usually accompanied by Kinglets, frequently by Brown Creepers and Warblers, and on one occasion by a Nuthatch. Three specimens, Massett, September 22.

Regulus satrapa olivaceus. GOLDEN-CROWNED KINGLET.—Fairly common. Almost invariably in company with Chickadees, and frequently with Brown Creepers and Warblers. Juvenile, Massett, July 5; two juveniles, Tow Hill, September 2; two adults, Massett, September 22. "These birds are very slightly brighter in colour on the back than comparable eastern birds. I rather hesitatingly refer them to *olivaceus* which seems a very slightly defined race."

Hylocichla guttata nannus. HERMIT THRUSH.—Common until the middle of July, after which time the number observed gradually decreased. Three specimens, Massett, June 26.

Planesticus migratorius propinquus. WESTERN ROBIN.—Common until the latter part of July, after which time they appeared to decrease in number. Considerable areas of land have been cleared in the vicinity of Massett Reserve, which may account for the fact that this species was more abundant there than in the other localities visited. Juvenile, Tow Hill, August 4.

Ixoreus naevius. VARIED THRUSH.—During the course of a day's walk one to four individuals were usually observed. A juvenile collected June 4 had only recently left the nest. Juvenile, Massett, June 4.

NOTES AND OBSERVATIONS

OCCURRENCE OF THE RED-THROATED LOON AT ROSSPORT. ONT.—Rossport, Ontario, is a station on the Canadian Pacific Railway about 50 miles east of Nipigon, and, as the name indicates, lies on Lake Superior. It is a fishing village pre-eminently, and little attention is paid to anything else. On my arrival there on June 20, 1911, I found in the yard of the little hotel, a drowned bird hanging on a ladder to dry. Enquiry elicited the fact that it was not wanted by anyone and that I might have it, so I promptly made a skin of a fine female Red-throated Loon. There was no indication of activity in the ovaries, so I presumed the bird was incubating or feeding young. Nesting of this species is probable in the small lakes back from Superior.—W. E. SAUNDERS.

OCCURRENCE OF IMMATURE EVENING GROSBEAKS IN ONTARIO.—On the shore of Pine Lake, Ontario, near Ingolf, early on the morning of August 5, 1920, we were awakened by the breakfast calls from hungry young throats in Knudsen's garden, and to our great delight we distinguished the mellow chatter of Evening Grosbeaks. Hastening out, we found an adult female feeding her two insatiable young birds—the first young Evening Grosbeaks, we believe, to be recorded for Ontario. The birds were carefully observed at close range with the aid of 8X binoculars. The fully fledged young were able to make the serpentine flight of the Grosbeaks, and they were observed flying about with their mother during the following three hours, while we remained there, but were not seen during the afternoon of August 12 when we returned after canoeing about Hawk, Falcon and High Lakes and Falcon River. Our complete records of Evening Grosbeaks made during this trip are: August 5, 6.30-9.30 a.m., adult female feeding two young near Pine Lake, Ontario; August 6, 2 p.m., heard, then saw, three flying north towards us from over Falcon Lake, Manitoba; August 7, 8.45 a.m., three flying westward along north shore of Falcon Lake; August 8, 7 a.m., "heard Evening Grosbeaks, Falcon Lake"; August 9, 7.40 a.m., heard, then saw, four flying high southward over High Lake; August 10, 5.40 a.m., two, and between 6.45 and 7.50 a.m., four individuals flying singly west along north shore of Falcon Lake, while at 8.00 a.m., six in a flock flew east (probably the earlier six returning). While the long wavy flight of the Grosbeaks would carry them easily from one of these lakes to another, it seems more probable that there were at least three on Pine, six at Falcon, and four on High Lakes.

In *The Auk* for October, 1920, (Vol. XXXVII, pp. 585-6), Prof. Wm. Rowan records the breeding of the Evening Grosbeak in Manitoba. He says also: "Mr. Lawrence visited Pine Lake on the borders of Manitoba and Ontario (actually in Ontario) on July 3. He found the Evening Grosbeak in some numbers but found no nest." This fact coupled with our record of the young birds seen 33 days later at or near the same place makes it seem very probable that Evening Grosbeaks bred in western Ontario in the summer of 1920. P. A. Taverner's article on "The Evening Grosbeak in Canada", (*The Canadian Field Naturalist*, March, 1921, Vol. XXXV, pp. 41-45) makes no mention of young Evening Grosbeaks ever having been recorded for Ontario.—RALPH E. DELURY; JUSTIN S. DELURY.

PALM WARBLER (*Dendroica palmarum palmarum*) AT HATLEY, QUE.—So far as I am aware this is the only record for the Province of Quebec. The bird first attracted my attention on May 12 of the present year, 1922. It was flitting about in a small wood adjoining the little marsh near my house, and from the first I felt sure it was *palmarum* and not *hypochrysea* or the Yellow Palm Warbler, as the under parts were very dull in comparison to the bright yellow of an example of *hypochrysea* I had seen in this same wood only a few days before. However, it was late in the afternoon, and having no gun I had to content myself with the hope that it would be there the following day. In this I was not disappointed, and after a search of some two hours, I again found the bird in a cedar tree and secured it, and later on sent it in the flesh, and presented it to the Victoria Memorial Museum at Ottawa. I find on reference to Knight's *Birds of Maine*, 1908, that there is no record of the species ever having been taken in Maine. Miss Inez Addie Howe of The Fairbanks Museum of Natural Science at St. Johnsbury, Vermont, writes me on June 10, 1922, that there are no records in the Museum for Vermont, their type specimens having been taken in Massachusetts. In Allen's *Birds of New Hampshire*, there are no spring records given, but an example was secured at Shelburne in the Androscoggin Valley on September 16, 1884, as recorded by Dr. A. T. Chadbourne, and Mr. Allen speaks of having taken specimens in the Saco Valley at Intervale between the 8th and 14th of September. Its reported presence at Manchester in spring, he goes on to say, is probably an error (*Proc. Manchester Inst. Arts and Sci.*, Vol. 11, p. 82, 1901). In *Life and Sport on the North Shore* (of the St.

Lawrence) by Napoleon A. Comeau, 1909, there is a reference on page 433 leading one to imagine that the Palm Warbler had been met with on some few occasions at Godbout. This is evidently an error, the birds referred to without doubt being the Yellow Palm Warbler (*D. palmarum hypochrysea*). At all events they are treated as such by Mr. Ridgway in his *Birds of North and Middle America*, Vol. 2, 1902.—HENRY MOUSLEY.

NOTE ON BRONZED GRACKLES.—Mr. C. E. Johnson (Vol. XXXVI, p. 60) speaks of Bronzed Grackles picking up dead minnows in gull-fashion from the surface of the water. Besides acting as scavengers these birds sometimes capture living fish. This I have seen them do in the Charles River Basin in Boston, and their prey was the three-spined stickleback. See *Auk*, XXXVI, 1919, p. 627.—CHARLES W. TOWNSEND, M.D.

EFFECT OF LIGHT ON COLOR OF BIRDS.—A distinguished lawyer in Winnipeg persists in declaring that last fall he saw amongst a large flock of Red-winged Blackbirds several that were "red-headed". I am convinced that Mr. L. L. Snyder is right in his allusion to the "effect of light that causes frequent reports of impossible birds". I have suggested to the lawyer that he saw some Brewer's Blackbirds illumined thus; but no, he won't have it!—H. M. SPEECHLY.

OCCURRENCE OF THE ROCK VOLE AT ROSSPORT, ONTARIO.—During my stay at Rossport, Ontario,

a little fishing village on the Canadian Pacific Railway about fifty miles east of Nipigon, in the latter part of June, 1911, the nights were devoted to trapping for small mammals and I had the satisfaction of taking a small number of *Microtus chrotorrhinus*, mostly gravid females and young. One specimen was taken in the sparsely wooded country and after that I hunted for more favourable places and trapped on the railway enclosure where there was a growth of grasses concealing the runways of the vole. The Biological Survey, Washington, writes me that this is several hundred miles west of the nearest previous location.—W. E. SAUNDERS.

CHILDREN COMPETE FOR FORESTRY ESSAY PRIZE.—Scores of school children in every school district of the Dominion are competing these days in the national school essay competition on Forestry and Tree Planting, inaugurated recently by the Canadian Forestry Association.

Questions as to the forest resources of Canada, the damage done by forest fires, what trees to choose for planting and how to plant them are being asked by a multitude of young people and the resultant information is being applied to the essay competition. Three substantial cash prizes are being given in each province and the effect of the national effort to stimulate juvenile interest in the forest resources of the country and the multiple benefits of tree planting has secured the hearty endorsement of all the departments of education which are giving every co-operation.

BOOK REVIEW

A GUIDE TO THE POISONOUS PLANTS AND WEED SEEDS OF CANADA AND THE NORTHERN UNITED STATES. R. B. Thomson, B.A., F.R.S.C., Associate Professor of Phanerogamic Botany, University of Toronto, and H. B. Sifton, M.A., Assistant Professor of Research in Botany, University of Toronto. *University of Toronto Press*, 1922, 8°. 169 pages with 40 illustrations in the text. Price, \$2.50.

This very attractive book was primarily written for the purpose of serving as a text-book for the students of the Ontario Veterinary College. As such it contains, in a brief, yet not unduly concentrated form, all available up-to-date knowledge of the poisonous plants encountered in Canada and the northern United States, including the characteristics by which they may easily be recognized, the symptoms produced by them, and the treatment required to effect cures in cases of poisoning.

In the treatment of their subject the authors

have departed from the usual method followed in most books and bulletins dealing with poisonous plants. Instead of arranging the plants in one long and, as a result, often confusing and tiresome list in accordance with their botanical relationship which hitherto has been a general practice, the authors have divided the book into four main sections dealing with the poisonous plants as follows:

- I. Plants dangerous when included in hay and coarse feed.
- II. Plants dangerous in pasture and on the range.
- III. Plants dangerous in ground feeds.
- IV. Poisonous plants which are rarely observed to cause death in animals.

From this arrangement it is seen that the first three sections deal with the plants which are chiefly responsible for fatalities among farm animals; they are therefore of special interest to

those who are particularly concerned in the welfare and health of stock. The fourth section includes plants which rarely cause injury or death to animals but which are poisonous to human beings; it is consequently of particular interest to the public in general.

The following number of poisonous plants are dealt with:

Section I.—Six genera with about a dozen species.

Section II.—Twenty genera with about two dozen species.

Section III.—Nine genera with as many species.

“ IV.—Thirty-one genera with about fifty species.

Section III, which deals with poisonous plants encountered in ground feeds, deserves particular attention. It is, as the authors assert, “the first time that the importance of poisonous plant constituents in concentrated feedstuffs has been given recognition in a text book.” The importance of including this section is apparent when it is realized that large quantities of elevator screenings containing a considerable proportion of more or less poisonous weed seeds are annually used in the manufacture of concentrated feed. Indeed, the losses suffered from the presence of poisonous constituents in such feed have recently been so great that the Dominion Department of Agriculture has found it necessary to design a special feedstuffs act and to provide for laboratory facilities where concentrated feeds can be microscopically analyzed and the presence of poisonous plant constituents in dangerous quantities ascertained.

In addition to the four main sections briefly referred to, a “Symptoms Key” to the principal poisonous plants is given by which it may be possible to determine, in the case of poisoning, which plant should likely be held responsible. The identification of poisonous plants found in hay or in the field is also greatly facilitated by the 40 excellent illustrations which the book contains.

As already stated, the *Guide to the Poisonous Plants and Weed Seeds of Canada and the Northern United States* was written primarily as a text-book for veterinary students. Its usefulness, however, extends far beyond its primary scope. It is written in such a pleasant style, and it is so free from all but unavoidably necessary technical terminology, that it should make entertaining and profitable reading not only to followers of the veterinary and medical professions and to students of natural history, but also to farmers, stockmen, and the public in general. Public and other libraries would be well advised to secure the book.—M. O. M.

THE CONSERVATION OF THE WILD LIFE OF CANADA, by C. Gordon Hewitt, D.Sc., late Dominion Entomologist and Consulting Zoologist. With numerous illustrations. New York Charles Scribner's Sons, 1921. 344 pages, 23 plates, 4 text figures, 10 maps, and five charts.

While this book is rapidly being recognized as a standard authority on the broad subject which it treats, it is of particular interest to the members of the Ottawa Field-Naturalists' Club, of which

organization the late Dr. Hewitt was an active member for several years and president for two years. It contains information with which every true field-naturalist should be familiar and no naturalist's library in Canada will be complete without it.

The importance of the subject may be realized by stopping to consider that Canada is the home and refuge of the most important and desirable wild animals of this continent. The large wild animals that were once found everywhere in the United States have melted away until only remnants are left in a few inaccessible or protected refuges. The northern part of the continent was less inviting to the settler and the forests, mountains and barren grounds of Canada have proved a sanctuary to by far the greater part of the surviving wild life of North America. The people of the United States now realize and deplore their shortsightedness in unnecessarily destroying their heritage and are endeavouring to rescue the fragments from complete and utter annihilation. The aim of Canada in this regard has been to profit by the mistakes of older countries and prove that the advance of civilization to the more remote sections of Canada shall be more than merely temporary, exploitation implying the total destruction of heritage due to prosperity.

As treated in Dr. Hewitt's masterly book the wild-life problem is restricted particularly to the larger wild mammals, many of which are commonly included under the head of big game, and to the birds of Canada. The fur-bearing mammals, having been recently discussed elsewhere, are not considered at length, except as far as their conservation in the wild state necessarily constitutes an important aspect of the general problem of wild life conservation. Canada is fortunate in having certain species of valuable animals not found elsewhere except in parts of the United States. Among these we find the moose, wapiti or elk, caribou, buffalo, mountain sheep, goats, muskoxen, and antelope, and all of these have been discussed extensively, rationally and sympathetically in Dr. Hewitt's book. It is valuable alike to the technical naturalist and to the general reader.

The value of wild life to the nation is first shown to have an economic significance, not because Canadians lack appreciation of their moral obligations or reasons of sentiment, but because the rapid opening up and development of the country came into direct conflict with the ability of many important forms of our wild life to survive. Lands not suitable for agriculture, as found in many forest reserves or areas of generally unfertile soils, are in many cases capable of a larger utilization by intelligent use of the wild life resources. The common native deer is shown to be an animal which increases and thrives from east to west with anything like reasonable protection and has been proved by practical demonstration in many states to produce a large meat-supply on non-agricultural areas.

The vast area of the Northwest Territories, by far the greater part of which is unsuited to agriculture, may be made to continue productive by properly conserving the game supply as a necessary adjunct to the preservation of the fur industry and the establishment of mining enterprises and other industries. The necessity of conserving a native food supply for Indians and Eskimos in northern districts is an important obligation which rests upon the nation since the common-sense conservation policies followed under the guiding influence of the old-time trading companies have been largely weakened by the enormous increase of cutthroat competition and by the virtual bounties

which are now on the heads of many animals in the shape of excessive prices for their pelts.

The recreative value of wild life is harder to place a value upon. Recreation is now recognized as an important factor in keeping up human efficiency, and who can estimate the influence of wild life in remote parks and mountains as an attraction to draw men out into the open. Whether one be sportsman or photographer, or just plain citizen, the presence of wild bird or animal life adds zest to his enjoyment of the scenery, and the same principle applies to the shortest suburban or country ramble.

One of the saddest features of the history of wild life during recent years has been the disappearance of a number of animals and birds that were formerly abundant, for they are resources which are beyond the power of man to replace. Destroyed forests may be replanted and ravaged cities rebuilt, but a vanished mammal or bird is gone forever. To the biologist, every species wiped out represents the end of a long line of ancestry running back far into the past before man with his destructive arms appeared on the scene.

The main axiom of wild life protection is that a species of animal must not be destroyed at a greater rate than it can increase. The remedy for thoughtless destruction is education, supplemented necessarily by legislation. Birds which have recently become extinct in Canada are the Passenger Pigeon, Great Auk, Labrador Duck, and (perhaps) Eskimo Curlew. Various adverse factors have entered into the wild life problem, the chief of which at all times is the market hunter. While acknowledging that much has been done in Canada towards protection, Dr. Hewitt does not fail to remind us that the sale of game is still permitted in certain provinces. Compared with the rapacity of men the destruction of our wild life by natural factors is slight although it must be considered.

For a long time, naturalists, sportsmen, game conservationists, and the general public who are interested in the wild life of Canada have desired to have in one volume an up-to-date account of the present status of the wild life of the country and a survey of the measures which have to be achieved in the preservation of this great heritage.

The late Dr. C. Gordon Hewitt was admirably fitted for this task. English by birth, a thorough zoologist by training as student and faculty member of Manchester University, of a cosmopolitan and open mind, he attacked problems without prejudice. Trained technically as an entomologist, he early appreciated the value of birds as insect destroyers and before leaving England he had done much to demonstrate publicly the truth of his theories. Coming to Canada in 1909 as Dominion Entomologist, he speedily built up the Entomological Branch to a state of recognized efficiency. But while recognizing the value of entomology, Dr. Hewitt had talents which led him farther afield, and the position of Consulting Zoologist was created for him in addition to his other duties. His acquaintance with the men and

the needs of all parts of the Dominion, begun on his frequent visits of inspection to every province, grew with years, and his excellent judgment of men and affairs was brought into excellent service. His standing had always been commanding in scientific circles, and as he realized that the conservation of wild life as a present and future asset of the country was not a question of party politics, his opinions were respected by statesmen and politicians of all parties in the different provinces, where the keenness of his observations, his obvious sincerity of motive, and the clarity of his common sense made his influence of supreme importance in bringing the lagging sentiment of the country into line with the principles of the now famous Migratory Birds Treaty consummated between Great Britain and the United States in 1916.

This much-discussed treaty has already accomplished more than its sponsors imagined in increasing the numbers of wild fowl which were being harried through lack of international co-operation in the preservation of an international asset, by winter market-hunting in the South, spring-shooting in the central states and the Canadian provinces, and lack of protection on the northern nesting grounds.

Dr. Hewitt was also active in framing the Regulations for the enforcement of the Migratory Birds Treaty and a little later was active in drafting the new North West Game Act, a far-reaching measure to protect the wild game and fur-bearing animals of the vast North West Territories and the future interests of the natives and settlers beyond the borders of what are now the settled parts of Canada.

Dr. Hewitt had unrivalled opportunities for obtaining fresh information. A frequent visitor at all the provincial capitals and the experimental farms in all parts of the Dominion, he had the friendship of men of affairs, scientific men, and local naturalists and observers, so that when disputed points came up he could marshal his information at first-hand, and in this book we have the cream of his data assembled systematically. His disarming candour and the absolute fairness of his treatment of colleagues and associates procured him sympathy and support for any plans which he brought forth. The book was adapted to fill a long-felt want and demand and represented a labour of love on the part of Dr. Hewitt during the spare hours of the last three or four years of his life, being completed and made ready for the printer only in the month before his death. Written in a beautifully pure and idiomatic English style, the book appeals from a literary as well as a scientific and educational viewpoint, and the publishers have done their part in bringing out the book in an attractive form. No one could have done the work better, and, coming when it did, it may fittingly be considered as a monument to Dr. Hewitt's accomplishments in what he would have wished to consider his most important life work.—R.M.A.



The Canadian Field-Naturalist

VOL. XXXVI

OTTAWA, ONT., NOVEMBER, 1922.

No. 8

FURTHER NOTES ON THE *RHOPALOCERA* OR BUTTERFLIES OF HATLEY, STANSTEAD COUNTY, QUEBEC, 1921-1922.

BY HENRY MOUSLEY

I FIND on reference to my last paper in *The Canadian Field-Naturalist*, Vol. XXXIV, 1920, No. 9, pp. 173-174, on the butterflies of this district, that three new species were added to the already existing list so that the total at the end of the year 1920 stood at forty-eight species, with very little prospects of any new additions in the near future. Certainly I never dreamt that the opening of another season would see not only the addition of a very rare little butterfly to my list, but also some contribution to its life history, which was practically unknown, and that the date upon which it was taken would also prove a record one in these parts. Yet so it was, for on April 30, 1921, (previous earliest date recorded, May 18,) I took a male example of the Early Hairstreak (*Erora læta*) in a little wood near my house, and on May 21, whilst climbing Mt. Orford, (2860 ft.) watched a female deposit an egg on the underside of a beech leaf which I secured. Up to that date the food plant was unknown, and I believe I am the only person who has witnessed the female deposit an egg in the open and amidst her natural surroundings, and seen the resulting larva. For these unexpected pleasures I am greatly indebted to Mr. Albert F. Winn of Montreal, who first drew my attention to *læta*, a fuller account of which, however, will be found in the pages of *The Canadian Entomologist*.

Other additions to my list consist of the Little Sulphur (*Eurema euterpe*), The Banded Hairstreak (*Strymon calanus*), and the Bronze Copper (*Heodes thoe*), all of which have been taken by Mr. Winn at East Bolton (which place comes within my radius), as recorded in his *A Preliminary List of the Insects of the Province of Quebec*, 1912, pp. 9-18. At Beebe on July 29, 1922, I secured a number of specimens of the Least Copper (*Heodes epixanthe*), and at Hatley on September 15 a female of the Eastern-tailed Blue (*Everes comyntas*), and these species with *læta* and the other three above named, and the form *violacea* Edw., of the Spring Azure (*Lycæropsis pseudargiolus*) which hardly seems worthy of a name, make a

total of fifty-five species and forms for Hatley and district to the end of the present year, 1922.

During the past two seasons there appears to have been a general falling off in the numbers of many of the species here represented, the most notable probably being amongst the Fritillaries. At one time the larger members of this genus such as The Great Spangled Fritillary (*Argynnis cybele*), The Silver-spot Fritillary (*A. aphrodite*) and The Mountain Silver-spot (*A. atlantis*), literally swarmed, but now they are not nearly so plentiful and this remark applies equally well to all the smaller members, more especially, however, to The Baltimore (*Euphydryas phæton*) Nycteis (*Phyciodes nycteis*), and Harris' Checker-spot (*Melitæ harrisi*). Certainly in 1921 I discovered two new stations for the latter near Ayer's Cliff, but only a very few specimens were seen. However, this is somewhat encouraging in view of the fact that it has entirely disappeared from the one and only meadow where I used to find it years ago. The genus *Polygonia* has been very poorly represented ever since 1919, the year in which it was so abundant. No examples whatever have been met with of The Violet Tip (*Polygonia interrogationis*) the largest and handsomest, and very few of the other members have been seen. The Compton Tortoise (*Aglaïs j-album*) as already mentioned in a previous paper is on the decrease, very few examples having been seen during the past two seasons. The Red Admiral (*Vanessa atalanta*). Hunter's Butterfly (*Vanessa virginienensis*), The Painted Lady (*Vanessa cardui*) and The Wanderer (*Feniseca tarquinius*) have not been seen at all, whilst only two examples of The American Tortoise-shell (*Aglaïs milberti*) have been noted on August 17 of the present year, 1922. The Pearly Eye (*Enodia portlandia*) has just about held its own, three specimens being seen in 1921, and two in 1922, which is about all I usually meet with in a season. I am afraid as already recorded that the cutting down and burning of all the shrubs on the roadside frequented by The Acadian and Striped Hairstreaks (*Strymon acadica* and *S.*

liparops) in the fall of 1920, has resulted in their extermination, as not a single example has been seen there since. Most of the Skippers were fairly plentiful, but I have no record of having seen The Arctic (*Carterocephalus palæmon*) in either year. In contrast to this apparent falling off in the number of some species may be mentioned the great increase in that of others. Never have I seen so many Tiger Swallow-tails (*Papilio glaucus canadensis*) as this year (1922). They literally swarmed at some of the puddles on the road side, and a photo sent me at the time by a friend who was staying near Metis on the Gaspé coast depicted a similar scene. The other member of the family, The Black Swallow-tail (*Papilio polyxenes*), also appeared in very fair numbers, but the greatest treat of all was the extraordinary abundance of our largest and handsomest butterfly in these parts, the Monarch (*Danaus archippus*). It is now four years since this great migrant paid us a visit, so it can be imagined with what pleasure I again saw it on June 24, from which date its numbers kept increasing until July 21, when I saw ten examples in one afternoon.

On July 10 I watched a female deposit several eggs on the underside of the leaves of the common milkweed (*Asclepias syriaca*), and on July 21 obtained about half a dozen full-fed larvæ from another locality. One of these changed to a chrysalis two days later, and the butterfly emerged on August 6, having been in the chrysalis shape exactly a fortnight. The egg stage of this butterfly is a very short one lasting only about four days. Those mentioned above hatched out in five days. The life history of this beautiful insect is a most interesting one. The butterfly is considered to be polygynous, that is to say, many broods are produced annually. Those we get in Canada represent a wave of immigration coming northward from the warmer Gulf States, which lay their eggs as they come. It is not believed that

any of them hibernate in any stage of their existence. In the fall they return, sometimes gathering in great swarms on the northern shores of Lakes Erie and Ontario and in southern New Jersey. Within recent years it seems to have effected a settlement in Australia, and has thence spread northward and westward until it has reached Java, Sumatra and the Philippine Islands.

Moving eastward on the lines of travel it has even reached the south of England, where, according to the published records from 1876 (the year in which it was first observed) to 1906, about thirty specimens have been seen or caught, one third of these being obtained in September, 1885. There is no question concerning the migratory habits of this butterfly but just how it reaches England is not definitely known, neither is it known whether upon arrival there it is able to reproduce its kind. It was first observed on the Continent in 1877 at La Vendée, France. In 1886, when half a dozen were recorded from England, single specimens were obtained in Guernsey, Oporto and Gibraltar. It has been taken, I believe, in the Canary Islands, and is well established at the Cape Verde Islands, and possibly by now has invaded Africa, where it would find the family of plants the larvæ feed upon well represented. With such a history behind it, is it possible to gaze upon the insect without experiencing some kind of emotion, and yet it is so, the vast majority of persons paying little or no attention to the beauties around them! Its counterpart, the Viceroy (*Basilarchia archippus*), the most striking case of mimicry which occurs in our fauna, has been seen on many occasions during the past two seasons, the largest specimens of which no doubt are often mistaken by the novice for the Monarch.

In conclusion the more we study nature the more do we see how wonderfully adjusted are her scales, a little increase here, a little decrease there, so that always the balance appears about equal.

THE EUROPEAN HARE IN ONTARIO

BY J. R. DYMOND

THE European Hare is one of the latest additions to the list of species introduced into Ontario from abroad. Its introduction was brought about by Mr. Otto Herold, formerly Manager of Bow Park Farm, near Brantford, Ont. In a letter from Mr. Herold, now of Danzig on the Baltic, he says,

"In February, 1912, when I was Manager of the Bow Park Farm near Brantford, I imported from Germany seven females and

two males. They belong to the species *Lepus timidus* and were exported to the farm by a German zoological exporter.

"When they arrived I kept them fenced in in order to see how they would do in the climate. However, they found a loophole and escaped. In the summer of 1912 we had already found a bunch of young hares. They usually have from two to three young hares about three or four times a year. In Germany the first young arrive in March which usually have young ones again the same year.

"My idea was to keep same on the Bow Park Farm which is nearly surrounded by water of the Grand River. I thought they would stay there but in winter when the ice came they escaped. I had no particular reason for importing them to Canada except that I am a lover of nature, especially harmless, useful animals. . . . Here it is a well known fact that their usefulness exceeds their destructiveness. There is certainly a great industrial value in these hares even if they do eat an occasional cabbage head or a turnip.

If this species is the native hare of Germany as Mr. Herold's letter suggests, it is *Lepus europaeus* Pallas. Miller's Catalogue of the Mammals of Western Europe in the Collection of the British Museum gives the range of *Lepus europaeus* Pallas, as "Central Europe from Great Britain to Russia and from the Baltic south to the Pyrenees, Italy and Greece" and of the typical subspecies *L. europaeus europaeus* as "Central Europe from Germany to the Atlantic Coast and from Denmark to Central France." The distribution of *Lepus timidus* Linnaeus, is "Northern portion of Europe and Asia. In Europe throughout Norway, Sweden and Northern Russia, also in Scotland and the Alps. Represented in Ireland by a distinct though nearly related species." Attempts to acclimatize *L. europaeus* in Ireland have failed,

according to the Cambridge Natural History.

The British Museum Catalogue referred to above gives the distinction between these two species in part as follows:

L. timidus and related forms.—Tail, including pencil, much shorter than hind foot; its upper surface white or clouded with brown or grey, never with clear black median area.

L. europaeus and its relatives.—Tail, including pencil, about as long as hind foot; its upper surface with conspicuous clear black median area.

I have not had an opportunity of examining specimens and am anxious to hear from anyone familiar with this animal in Ontario. They are apparently spreading quite rapidly. Last winter they were reported from the Niagara Peninsula, Ingersoll and Guelph. No complaints of their destructiveness have been heard. On the other hand, there is some agitation for their protection because of their value as game.

Since the above was written, the Museum has received from Mr. A. G. Montgomery of Brantford two specimens of this hare. They prove to be *L. europaeus* as was expected. Reports of injury to crops have also come from sections where the hares are numerous.

A RECENT BREEDING RECORD OF THE TRUMPETER SWAN IN ALBERTA

BY HOYES LLOYD

IN OCTOBER, 1920, Mr. R. F. Jones, the Manager of the Longfellow Zoological Gardens at Minneapolis, Minnesota, wrote to the Canadian National Parks Branch, Ottawa, asking permission to export a live Swan from Canada, this bird being then in the possession of Mr. L. E. Bodie, of Clairmont, Alberta. Mr. Jones wished to obtain this bird as a mate for one in his possession and upon inquiry stated concerning Mr. Bodie's bird: "It is known as the Trumpeter, or Piping Swan. This is the only species that I have ever been able to secure in the Northwest. They are a large white bird with black feet and bill. Are very tame when domesticated and thus a rarely attractive one."

Possibly ornithologists who have access to Mr. Jones' zoological collection at Minneapolis may be able to record some occurrences of the Trumpeter Swan if they study his specimens and records.

After consulting the Advisory Board on Wild Life Protection the Canadian National Parks refused permission to export this Swan from

Canada, at least until its identity was established.

Colonel Perry, Commissioner, Royal Canadian Mounted Police, was furnished with complete descriptions of both Trumpeter and Whistling Swans and plaster casts of the heads of the two species and requested to have one of his officers endeavour to identify the bird in Mr. Bodie's possession.

On January 26, 1921, Sergeant T. C. Davies, in charge of Grande Prairie Detachment of the Royal Canadian Mounted Police, made a patrol to carry out his ornithological mission. He visited the Bodie farm, which is 10 miles west of Clairmont, Alberta, and immediately north of Bear Lake on the south half of Section 3 Township 73, Range 7, West of the 6th Meridian. This is almost 55° North Latitude, 119° West Longitude.

He found that the bird had died on January 14th, and that its body was still in one of the sheds. The officer took the wing measurement as 22½ inches, and found the weight of the frozen body on spring scales to be 19½ lbs.

Extracts from the statement taken by Sergt. T. C. Davies from Mr. Lawrence Bodie are given below:

Clairmont, P.O.

January 26, 1921.

"In July, 1919, I saw a young swan in the shallow waters of Bear Lake, near my father's farm. I went out and caught it with my hands. I would judge it to be about one week old. I brought it home and turned it loose among our chickens. The Swan was never penned up or held in any way, it was always free to come and go as it wished, it would fly 'round the neighborhood but always returned to our farm, it was quite tame and would follow us around.

"I wrote the Game Authorities in Edmonton, asking them for a Permit to have the swan in my possession and also to dispose of it but they informed me that they could not give me any permits. I then tried to get rid of the bird by taking it down to the Lake three miles from the farm and turning it loose, I did this three times but each time it returned to the farm. I then realized that I could not drive it away so let it stay around.

"About three weeks ago I noticed the swan acting as if it had a cold, it seemed to eat well but its breathing was not free and on the 14th of the month I noticed it lying dead in one of the sheds.

"The dead body of the swan is still in my possession. . . .

"I have now turned the body of the Swan

over to Sgt. Davies, of the R.C.M.P."

(Signed) L. E. BODIE.

Witness:

T. C. DAVIES,

Sgt., R.C.M.P.

Thus by a strange series of events a specimen of the Trumpeter Swan, *Olor buccinator*, came into the possession of the Branch. The specimen was well prepared by Wolfe & Hine, taxidermists, of Edmonton, and the sternum and trachea were preserved. It is a ♂ and of special interest because it is of known age, namely 17½—18½ months. Consequently, from it the development of convolutions of the trachea at that age may be determined, and it indicates of course, the size, weight, and plumage development of the species at that age.

It furnishes as well a breeding record for the species in the Province of Alberta. The only other published breeding records for the species in that Province of which I am aware are as follows:

April 7, 1891, nest with 5 eggs, at Buffalo Lake; W. E. Raine;¹

Spring 1885, nest with 4 eggs, at Sounding Lake, recorded by W. E. Raine,² on authority of a Mr. Sanderson.

In view of the fact that Coale³ located only sixteen Trumpeter Swan specimens with authentic data preserved in museums, this specimen will form a valuable addition to the collection in the Canadian National Museum, to which institution it has been presented.

¹Macoun & Macoun—*Catalogue of Canadian Birds*, 2nd Edition (1909), p. 135.

²loc. cit., p. 135.

³*The Auk*, Vol. XXXII, pp. 82-90.

MIGRATION OF THE BRANT (*Branta bernicla*) IN GREENLAND

BY DR. MORTEN P. PORSILD,

Direktor, Den Danske Arktiske Station (The Danish Arctic Station), Disko, Greenland.

During the years 1919 and 1920, following the publication by the Dominion Parks Branch of a little brochure on *The Brant of the Atlantic Coast*, the writer carried on some correspondence with Dr. Porsild in regard to the migration of the Brant in western Greenland, and, while on a visit to Ottawa in 1922, Dr. Porsild discussed the matter further, consenting to the publication of the notes.

The nomenclature of the species is rather confusing, as many writers do not separate the European bird, *Branta bernicla* (Linn.) from the alleged American subspecies *Branta bernicla glaucogastra* (Brehm.), the latter bird being differentiated as having lighter underparts.

The American Ornithologists' Union Check List (1910) gives *Branta bernicla bernicla* as "Extralimital", and gives the range of *Branta bernicla glaucogastra* (Brehm.) = *Branta glaucogaster* Brehm., *Handbuch Vogel Deutschl.*, 1831, 849 (German coast of Baltic Sea) as follows: "Range—Northern Hemisphere. Breeds on Arctic islands north of latitude 74° and west to about 100°, and on the whole west coast of Greenland; winters on the Atlantic coast from Massachusetts south to North Carolina, rarely to Florida; has been recorded in the interior from Manitoba, Ontario, Colorado, Nebraska, Wisconsin, Michigan, Indiana, and Louisiana; accidental in British Columbia and Barbadoes."

Professor W. W. Cooke, in his *Distribution and Migration of North American Ducks, Geese, and Swans*, U.S. Dept. of Agriculture, Biological Survey, Bulletin No. 26, 1906, under *Branta bernicla glaucogastra* (Brehm.) "White-bellied Brant," states: "The eastern brant breeds on the west coast of Greenland from Frederikshaab, latitude 62°, northward probably as far as land extends, certainly as far north as the north shore of Grinnell Land, latitude 82° 33', etc., etc."

Other authors state that in Spitsbergen and northern Europe both light and dark-bellied birds are found. Hartert, *Scottish Naturalist*, 1917, considers that *Branta bernicla* (*Branta bernicla glaucogastra*) is a dimorphic form; if the American bird is separable it is *Branta bernicla collaris* (Brehm.).

In a letter to Dr. Porsild on February 27, 1920, the writer stated: "The bulk of the American birds at least, according to the authorities, seem to be of the light-bellied form. The natural route of migration would be for many of these birds to migrate north from Labrador to the west side of Greenland. Probably a good many European birds (*Branta*) come from Europe to east Greenland by way of Iceland, and no doubt some of them get across to West Greenland. It would seem more natural, however, for such birds to go north along the coast of East Greenland instead of swinging south around the southern end of Greenland or perhaps crossing over the center

of Greenland in a southwesterly direction. It would seem quite possible for Brant to come up along the west coast of Greenland, following the coast pretty closely and, after striking the south side of Disko island, to swing around so as to come from the northeast in the locality of Godhavn. The Black Brant of the western Arctic, so far as my observations go, seem to follow the coast line pretty closely in their migrations, though of course when necessary to 'make a passage' across a strait they are not averse to doing so. I think a good deal of the confusion about American and European forms of the same species is due to not having enough specimens together from both sides of the Atlantic. The European museums have large series of European birds and the American museums have the American-taken specimens, and seldom is there an opportunity to examine both sets of specimens side by side."—R. M. ANDERSON.

WHAT I know about the Brant in Greenland is not much beyond what has been written by H. Winge in his excellent "Grönlands Fugle", *Meddelelser om Grönland* 21, 1898. My station, is situated near the colony of Godhavn on South Disko. This place is one of the very few spots known to me in Greenland regularly touched by migrating Brants. As a joke I used to say: "The Brants are coming June 3rd at 6 o'clock p.m." and, in fact, during the thirteen years of my residence at the place, the first Brants were seen from June 1st to 3rd without any regard to weather conditions. I do not know where they cross Disko Bay; to us they come from northeast, flying along the steep wall of the basalt mountain "Skarvefjaeld". Leaving the shore here, they cross the small "Sortesandsbugt" along the border of the last winter ice, steering straight to Upernavik naze, where the natives shoot at the flocks.

The neck of Godhavn Peninsula between the Harbour and Sortesandsbugt is very low and sandy. If they would fly over that neck every one would escape from the shooting, but they never do. The flocks are usually very great, from one to several hundreds each, and normally several hundred thousand Brants pass us every year. Some years, however, the number is much smaller.

Curious is the varying of the dates for migration. Now the date is as said about the 3rd of June. In the years about 1812 they came the last days of May, about 1840 the date was between the 8th and 12th of June, and in 1882 the dates were 8th to 11th June. Each of the years mentioned does not mean that single year, but a series of subsequent years of varying number.

I have hitherto applied in vain to the natives for other migration stations than this; only casually small flocks or single stragglers were observed. They are often seen on Northeast Disko, and one of my informants believes that they nest there. But as that region is uninhabited and very rarely visited I doubt the correctness of the statement. North of the 73rd parallel nests were known in former times. Now I think nests do not occur except at Smith Sound, and Mr. W. Elmer Ekblaw, member of the Crocker

Land Expedition, told me that nests were comparatively scarce on the north coast of Greenland, whereas Ellesmere Land and Grant Land were the veritable El Dorado of the Brant.

Once I succeeded in getting a live pair on North Disko in August. The female had a broken wing and the male could not or would not quit her, so my Eskimo companion ran them down and caught them. I had them in my boat some fourteen days, until I got home. They were very greedy and I fed them with everything obtainable, but mostly with *Equisetum arvense*. After my return the female drowned by an accident and the male was killed when the frosts came.

I (formerly) believed that the Brant wintered in Europe only, and not in America, and it was to me a favourite object for fairy tales to children: the Brants coming June the third, steering straightway from Europe through snow and gales to our little naze and building their nests on far Ellesmere Land were most fascinating. Now I see that they do winter in America, the story becomes a little less fascinating, but more natural.

When I come back, I shall try to send out question schedules over the whole of West Greenland; our Eskimo are intelligent and interested observers. If I succeed in getting some valuable information about the tracks of the Brant, I shall send it to you.

Copenhagen, April 8, 1920

As much has been published since the book by Herluf Winge on the Birds of Greenland in 1898, I went today to Mr. Winge to get information from our first authority. Winge considers all Brants from East as well as West Greenland to be the same race, namely, the light-bellied *glauco-gastra*, and he does not doubt that all Greenland Brants migrate to America and not to Europe. About the racial value of the *glauco-gastra*, Mr. Winge was rather uncertain. Ordinarily he is rather conservative in taxonomy.

I think the statement by Cooke, quoted by you, as to the breeding of the Brant down to 62° in West Greenland is wrong. It does breed at 73°, but only casually, and as far as I know, partially from verbal information by Mr. Ekblaw only a few birds breed in the northernmost part of Greenland, whilst Ellesmere Land is the great breeding place for the millions of Brants passing us.

BIRDS OF A SUBURBAN GARDEN

BY R. OWEN MERRIMAN.

EVER since the days of Rev. Gilbert White, observers have realized the importance of records of the natural history of limited areas; and in ornithology local lists have been made and published for very many localities. These lists are nearly all for comparatively large areas, a farm of many acres being the smallest area which observers seem inclined to treat as a unit. The writer and his neighbor, W. F. Ambrose, having been compelled for reasons of health to limit their observations chiefly to one garden, have been pleased to find the list of species identified within its boundaries grow to unexpected dimensions; and they have wondered whether their location is especially favorably situated for such observations or whether similar lists could be made for other areas of similar size. Those who have kept records for small gardens may be glad to compare this list with theirs, as the writer would certainly be glad to do.

This garden is situated in a suburb of Hamilton, Ontario, Canada, on the Niagara escarpment, and about three hundred yards south of its edge, two hundred and fifty feet above the level of Lake Ontario. The escarpment here forms the south limit of the city of Hamilton, which lies below and extends northward to its harbour, two miles away. The land on the top of the escarpment is gently rolling; and is partly built up for half a mile from the edge. This suburban district has many trees; but to the south the farm lands have few orchards and fewer wood-lots. The nearest water is a small stream a mile away. On three sides of this garden there are houses within one hundred feet; but on the west there are only one or two houses within a quarter of a mile. On this side lies a meadow, beyond which runs a long private avenue of Norway spruce, horse-chestnut, maple and elm. To this open, quiet space, and to the fact that there is little traffic on the street to the east of the garden, much of its attractiveness to birds may be due.

The garden itself is a rectangle, two hundred and fifty feet by one hundred and sixty feet, or about five-sixths of an acre. Near the north boundary is a large brick house with a small out-house; and near the middle of the west boundary is a small, low cottage. On the north half of the area are eighteen small trees, maples, horse-chestnuts, one Lombardy poplar, and fruit-trees; and around the house are a few shrubs, three clumps of staghorn sumach (*Rhus typhina*) merit-

ing special notice. A few flowers and vegetables are also grown. The grass on the north half of the area is kept as a mown lawn, but on the south half most of it is cut only once during the summer. Overhanging the roof of the above-mentioned cottage is the only large tree in the area, a white oak; and nearby is a ten-year-old elm. Along the south boundary is a widely-spaced row of Norway spruce. The most important feature of the garden is a thicket which extends along the west boundary, forming the south end of a thicket which follows this fence for nearly two hundred yards. This thicket, here about twenty feet wide and fifteen feet high, is composed chiefly of wild plums, but includes seedling pear and cherry trees in bearing, many seedling maples, wind-sown from a tree just over the west edge of the area, sweet brier and rugosa roses, and bittersweet and Virginia creeper climbing some of the trees. The thicket is not pruned or raked, the carpet of leaves and the many dead twigs and branches proving definite attractions. It is in this thicket that most of the observations are made, especially during the seasons of bird migration.

During the winter, supplies of food are available in the area for such species as will accept them. Sumach and bittersweet have been mentioned already. Two inverted feeding-boards built after the design of W. E. Saunders are kept filled with seeds and suet, and seeds and table-scraps are sprinkled on the ground. House Sparrows are discouraged with trap and gun. It is during the spring migration that the largest number of species is observed; but all that can be done to encourage the visits of migrants is to keep the garden as quiet as possible, to delay raking and other gardening, and to discourage the visits of neighbors' cats. In May it is not unusual to observe twenty species in the garden in one day; and in five hours on May 20, 1920, thirty-four species were identified by one observer while seated in one spot. During the breeding season, nesting material attracts some individual birds; and nesting-boxes of various sizes have been erected in suitable sites. The two bird-baths which are kept filled in all but freezing weather are known to have been used by about twenty species; by some only for drinking. Far fewer birds are recorded during the fall migration than during the spring, partly because of the greater difficulty of distinguishing between similar species in fall plumage, and partly because the trees are in fuller leaf.

The observations on which the following list is based were begun in 1907; but at first records were kept only in a sketchy fashion. As the knowledge of the observers grows, they find greater interest in referring to their records, which are being made with increasing attention to detail. In compiling the list, no species has been included unless identified as positively as is possible by sight alone; and care has been taken especially to remove all doubtful records of species not usually seen in the vicinity.

1. *Larus argentatus*. HERRING GULL.—Flocks of fifteen or less frequently seen flying overhead in winter and spring, in search of food among manure on fields. These flocks may also include *L. delawarensis* as these two species are found together on Lake Ontario in spring.

2. *Branta canadensis canadensis*. CANADA GOOSE.—Flocks rarely seen flying over in spring and fall. One record of two flying about twenty feet above ground into gale and snow-storm. Flocks of unidentified Ducks regularly fly over in spring and fall.

3. *Ardea herodias herodias*. GREAT BLUE HERON.—One bird observed flying over.

4. *Oryechus vociferus vociferus*. KILLDEER.—Abundant summer resident in the vicinity.

5. *Bonasa umbellus togata*. CANADA RUFFED GROUSE.—One seen in May, 1915, later found dead. Now rare in vicinity.

6. *Accipiter velox*. SHARP-SHINNED HAWK.—Rarely seen.

7. *Falco sparverius sparverius*. SPARROW HAWK.—Rarely seen. Hawks are frequently seen soaring and sailing overhead in summer, not identified further than as belonging to the genus *Buteo* or genus *Archibuteo*.

8. *Cryptoglaux acadica acadica*. SAW-WHET OWL.—Flock of five or six seen. June 26, 1921.

9. *Otus asio asio*. SCREECH OWL.—Heard frequently throughout the year, but seldom seen. Other Owls occasionally heard.

10. *Coccyzus americanus americanus*. YELLOW-BILLED CUCKOO.—Seen every year, but infrequently.

11. *Coccyzus erythrophthalmus*. BLACK-BILLED CUCKOO.—Seen occasionally every year.

12. *Dryobates villosus villosus*. HAIRY WOODPECKER.—Seen every winter, in some winters a regular visitor at feeding stations.

13. *Dryobates pubescens medianus*. DOWNY WOODPECKER.—Common throughout the year. At feeding station regularly in winter and occasionally, with young, in summer.

14. *Sphyrapicus varius varius*. YELLOW-BELLIED SAPSUCKER.—Not common, but recorded every spring.

15. *Melanerpes erythrocephalus*. RED-HEADED WOODPECKER.—Common summer resident.

16. *Colaptes auratus luteus*. NORTHERN FLICKER.—Very common summer resident. One visited feeding station regularly through the winter of 1919-1920.

17. *Anrostomus vociferus vociferus*. WHIP-POOR-WILL.—Heard occasionally every year, usually in May.

18. *Chordeiles virginianus virginianus*. NIGHT-HAWK.—Very common in summer. Breeds in the city of Hamilton.

19. *Chaetura pelagica*. CHIMNEY SWIFT.—Very common in summer.

20. *Archilochus colubris*. RUBY-THROATED HUMMINGBIRD.—Very common in summer.

21. *Tyrannus tyrannus*. KINGBIRD.—Common in summer.

22. *Myiarchus crinitus*. CRESTED FLY-CATCHER.—Seen regularly in spring and rarely in summer.

23. *Sayornis phoebe*. PHOEBE.—Seen frequently in spring and fall, but not often in summer.

24. *Myiochanes virens*. WOOD PEWEE.—Fairly common in summer.

25. *Empidonax flaviventris*. YELLOW-BELLIED FLYCATCHER.—Regular spring migrant, rather rare.

26. *Empidonax minimus*. LEAST FLYCATCHER.—Common in summer.

27. *Cyanocitta cristata cristata*. BLUE JAY.—Common all year. Visits feeding station in winter.

28. *Perisoreus canadensis canadensis*. CANADA JAY.—Very few records. Seen in vicinity almost every winter.

29. *Corvus brachyrhynchos brachyrhynchos*. CROW.—Common except in January, when few are seen.

30. *Dolichonyx oryzivorus*. BOBOLINK.—Common in spring and early summer.

31. *Molothrus ater ater*. COWBIRD.—Common in summer. Young usually fostered by Song Sparrows.

32. *Agelaius phoeniceus phoeniceus*. RED-WINGED BLACKBIRD.—Very few records, though not uncommon in the vicinity.

33. *Sturnella magna magna*. MEADOWLARK.—Common in summer.

34. *Icterus galbula*. BALTIMORE ORIOLE.—Fairly common in summer.

35. *Euphagus carolinus*. RUSTY BLACKBIRD.—Very large flocks, including this and other species, of Blackbirds gather in Dundas Marsh three miles to the north-west in the fall, flying over the area at sunrise and sunset on the way to and from feeding in stubble and ploughed fields.

Also occasionally recorded in trees in the area.

36. *Quiscalus quiscula æneus*. BRONZED GRACKLE.—Very common in summer. Less common during last two years than formerly, though apparently increasing in the city.

37. *Hesperiphona vespertina vespertina*. EVENING GROSBEAK.—Flock of eight or ten frequently visited the garden in January, 1920, feeding on staghorn sumach.

38. *Pinicola enucleator leucura*. PINE GROSBK.—One March record of a flock of about twenty-five.

39. *Carpodacus purpureus purpureus*. PURPLE FINCH.—Rare in area but not uncommon spring and fall migrant in vicinity.

40. *Passer domesticus domesticus*. HOUSE SPARROW.—A pest!

41. *Astragalinus tristis tristis*. GOLDFINCH.—Very common in summer, often nesting in the area. Flock occasionally seen in winter.

42. *Spinus pinus pinus*. PINE SISKIN.—Regular early spring migrant.

43. *Passerculus sandwichensis savanna*. SAVANNAH SPARROW.—One record. Common summer resident in vicinity.

44. *Zonotrichia leucophrys leucophrys*. WHITE-CROWNED SPARROW.—Regular spring migrant, not common.

45. *Zonotrichia albicollis*. WHITE-THROATED SPARROW.—Regular migrant, very common in spring, less common in fall.

46. *Spizella monticola monticola*. TREE SPARROW.—Rare winter visitor. Not uncommon in vicinity.

47. *Spizella passerina passerina*. CHIPPING SPARROW.—Very common in summer, nesting in area.

48. *Spizella pusilla pusilla*. FIELD SPARROW. Spring migrant, only a few records.

49. *Junco hyemalis hyemalis*. SLATE-COLORED JUNCO.—Common in spring and fall, and in some years also common in winter at feeding station.

50. *Melospiza mleodia mleodia*. SONG SPARROW.—Very common in summer, regularly nesting in area.

51. *Melospiza georgiana*. SWAMP SPARROW.—One record. Not uncommon in certain localities within a few miles.

52. *Passerella iliaca iliaca*. FOX SPARROW.—Regular spring migrant. During the last two years common both spring and fall.

53. *Pipilo erythrophthalmus erythrophthalmus*. TOWHEE.—Regular spring migrant, rather rare in area though not uncommon in vicinity.

54. *Zamelodia ludoviciana*. ROSE-BREASTED GROSBK.—Seen once or twice almost every spring.

55. *Passerina cyanea*. INDIGO BUNTING.—Formerly seen frequently, but rarely seen in last ten years though still a common summer resident within a mile. Perhaps influenced by the building up of this neighborhood.

56. *Piranga erythromelas*. SCARLET TANAGER.—Usually seen once or twice each spring.

57. *Progne subis subis*. PURPLE MARTIN.—Common in summer.

58. *Hirundo erythrogaster*. BARN SWALLOW.—Fairly common in summer. More common prior to about 1910 than now.

59. *Bombycilla garrula*. BOHEMIAN WAXWING.—Two winter records.

60. *Bombycilla cedrorum*. CEDAR WAXWING.—Seen irregularly throughout the year in flocks of from ten to fifty.

61. *Lanius borealis*. NORTHERN SHRIKE.—One winter record.

62. *Vireosylva olivacea*. RED-EYED VIREO.—Seen throughout every summer.

63. *Vireosylva gilva gilva*. WARBLING VIREO.—Regular but rather rare spring migrant; also occasionally seen in fall.

64. *Laniro vireo solitarius solitarius*. BLUE-HEADED VIREO.—Three records in spring and two in fall.

65. *Mniotilta varia*. BLACK AND WHITE WARBLER.—Common in spring and fall, occasionally seen in summer.

66. *Vermivora ruficapilla ruficapilla*. NASHVILLE WARBLER.—One or two seen each spring recently.

67. *Compsothlypis americana usneae*. NORTHERN PARULA WARBLER.—Several spring records but none since 1919.

68. *Dendroica tigrina*. CAPE MAY WARBLER.—Several spring records in recent years.

69. *Dendroica aestiva aestiva*. YELLOW WARBLER.—Very common in summer. Nests abundantly in immediate neighborhood.

70. *Dendroica caerulescens caerulescens*. BLACK-THROATED BLUE WARBLER.—Very common migrant in spring and fall.

71. *Dendroica coronata*. MYRTLE WARBLER.—Regular spring and fall migrant.

72. *Dendroica magnolia*. MAGNOLIA WARBLER.—Very common spring and fall migrant.

73. *Dendroica cerulea*. CERULEAN WARBLER.—One record in spring, April 25, 1921; bird identified with 3X prism binoculars at thirty feet in excellent light. Rare migrant in vicinity.

74. *Dendroica pensylvanica*. CHESTNUT-SIDED WARBLER.—Common spring migrant, very few fall records.

75. *Dendroica castanea*. BAY-BREASTED WARBLER.—Uncommon spring migrant.

76. *Dendroica striata*. BLACK-POLL WARBLER.—One or two seen each spring.

77. *Dendroica fusca*. BLACKBURNIAN WARBLER.—Regular spring migrant, one fall record.

78. *Dendroica virens*. BLACK-THROATED GREEN WARBLER.—Uncommon spring migrant, one fall record.

79. *Dendroica vigorsii vigorsii*. PINE WARBLER.—Only one spring record for area. Regular migrant in vicinity, but probably influenced by absence of pine trees from the area and its immediate neighborhood.

80. *Dendroica palmarum palmarum*. PALM WARBLER.—Two spring records.

81. *Dendroica discolor*. PRAIRIE WARBLER.—One spring record, May 12, 1920, when distinctive marks on back clearly seen with 6X prism binoculars, bird under observation for several minutes in good light. Very rare in vicinity.

82. *Seiurus aurocapillus*. OVEN-BIRD.—Common in migration. Sometimes breeds in vicinity

83. *Seiurus noveboracensis noveboracensis*. WATER-THRUSH.—One spring record.

84. *Geothlypis trichas trichas*. MARYLAND YELLOW-THROAT.—Common spring migrant.

85. *Wilsonia pusilla pusilla*. WILSON'S WARBLER.—Records only for spring in last two years. Regular migrant in vicinity.

86. *Wilsonia canadensis*. CANADIAN WARBLER.—Common in spring, seen also in fall, one August record.

87. *Setophaga ruticilla*. REDSTART.—Very common in spring, and also seen in fall.

88. *Dumetella carolinensis*. CATBIRD.—Common in summer, breeding in immediate neighborhood.

89. *Toxostoma rufum*. BROWN THRASHER.—Common in spring.

90. *Troglodytes aedon aedon*. HOUSE WREN.—Very common in summer, two to four broods being raised each year in the area.

91. *Nannus hiemalis hiemalis*. WINTER WREN.—Spring records in three recent years.

92. *Certhia familiaris americana*. BROWN CREEPER.—Common spring and fall migrant, occasionally seen in winter.

93. *Sitta carolinensis carolinensis*. WHITE-BREASTED NUTHATCH.—Usually common in winter and seen throughout the year. Visits feeding station regularly in winter, and occasionally, with young, in summer.

94. *Sitta canadensis*. RED-BREASTED NUTHATCH.—Fairly common in spring and fall migrations.

95. *Penthestes atricapillus atricapillus*. CHICKADEE.—Common in winter, seen throughout the year. Visits feeding station commonly in winter, and occasionally, with young, in summer.

96. *Regulus satrapa satrapa*. GOLDEN-CROWNED KINGLET.—Common spring and fall migrant, occasionally seen in winter.

97. *Regulus calendula calendula*. RUBY-CROWNED KINGLET.—Very common spring and fall migrant.

98. *Hylocichla mustelina*. WOOD THRUSH.—Rare spring migrant in area. Occasionally breeds in vicinity.

99. *Hylocichla fuscescens fuscescens*. VEERY.—Regular visitor in spring. Not seen in the area in summer, though breeding regularly within one mile.

100. *Hylocichla alixiae alixiae*. GRAY-CHEEKED THRUSH.—Occasionally identified in spring and fall.

101. *Hylocichla ustulata swainsoni*. OLIVE-BACKED THRUSH.—Common migrant in spring and fall.

102. *Hylocichla guttata pallasi*. HERMIT THRUSH.—Common migrant in spring and fall.

103. *Planesticus migratorius migratorius*. ROBIN.—Very common in summer, breeding regularly within the area. Sometimes a few winter in the vicinity.

104. *Sialia sialis sialis*. BLUEBIRD.—Common in summer, breeding within the area.

FURTHER NOTES ON THE FERNS OF HATLEY, STANSTEAD COUNTY, QUEBEC, 1921-1922.

BY HENRY MOUSLEY

IN MY previous paper on the ferns of this district, *The Canadian Field-Naturalist*. Vol. XXXIV, 1920, No. 7, pp. 137-140, I find that forty-one species and varieties were recorded. To this number may now be added the following, viz: *Thelypteris spinulosa*, *Thelypteris Bootii* var.

multiflora Dav.; *Botrychium lanceolatum* var. *angustisegmentum*; *Woodsia ilvensis*; *Cryptogramma Stelleri*, and *Asplenium Trichomanes*. these six now bringing the total up to forty-seven species and varieties to the end of the present year, 1922, fuller particulars of which will be found

in the annotated list which follows hereafter. In addition to these forty-seven species and varieties, there are several interesting hybrids of the *Thelypteris* (*Dryopteris*) family, which, thanks to the help of Dr. Philip Dowell (who has made a special study of them), I am able to include here, viz: *T. Clintoniana* x *Goldiana*, *T. cristata* x *Goldiana*? *T. Clintoniana* x *marginalis*?, *T. cristata* x *marginalis*?. It has been thought advisable to place a note of interrogation after the last three, in view of the fact that there is still some uncertainty as to whether they are Clinton crosses or crested crosses. It is indeed no easy matter in some cases to make absolute definite determinations with regard to these hybrids, but looking to the fact that *cristata* is far more numerous than *Clintoniana* it is more than probable that they are crosses by the first named, although I should not be surprised if they all occur here.

It will no doubt be remembered that I drew attention to the fact of the scarcity in my list of purely rock-loving ferns, due to the fact of the rocky localities lying at some distance from Hatley, and my inability to visit them very often. In order to see approximately what rock species might reasonably be expected in this district, I consulted the lists of the most famous localities in the state of Vermont (which adjoins our County of Stanstead), such as Willoughby Lake, Dorset, Manchester, and Pittsford, from which I gathered that the following species had been taken in most of them, and might reasonably be looked for here, viz.: *Pellaea atropurpurea*, *Cryptogramma Stelleri*, *Asplenium viride*, *Asplenium Trichomanes*, *Asplenium Ruta-muraria*, *Camptosorus rhizophyllus*, *Woodsia ilvensis*, and *Woodsia alpina*. Of these eight species, I have this season (1922) found the following three, viz: *Cryptogramma Stelleri*, *Asplenium Trichomanes*, and *Woodsia ilvensis*. Assuming it possible to obtain the remaining five (which I am afraid is not very likely) Hatley would then have a list of thirty-seven true ferns, or a lead of one over Willoughby Lake which now heads the list with thirty-six species, having only just recently attained to this honour by the discovery there on July 4, 1921 of *Athyrium angustifolium* by Mr. E. J. Winslow, who speaks of this as being the farthest northeast station so far known to him for this species. Evidently he is unaware of my having found the species here at Hatley, but only in one wood. Another station, however, was discovered at Ayer's Cliff (about seven miles from Hatley) by a lady during the present summer (1922), but only a very few plants were noted, not more than four I think. With the addition of *Thelypteris spinulosa*, *Cryptogramma Stelleri*, *Asplenium Trichomanes*, and *Woodsia ilvensis*, the

list of true ferns found at Hatley now stands at thirty-two species, or four behind that of Willoughby Lake. My first real fern hunt for the season of 1922 took place on June 26, when I climbed Mt. Orford (2860 feet) for the third time since 1918. The principal object of the present ascent was to determine definitely the identity of a fern I had found at the summit on May 21, 1921, the fronds of which were only just uncurling at that date, and also to try and add some of the rock species to my list. In this I was successful, as *Woodsia ilvensis* fell to my lot, and the species at the sumit was found to be *Thelypteris spinulosa* var. *americana*, of which there were several large beds in full fruit. On the way down I came upon one plant of Braun's Holly Fern (*Polystichum Braunii*), thus adding a second station for this, interesting species. As already intimated I feel sure this mountain will well repay systematic working. The area is a very large one, the long spurs leading to the summit would alone take many days to examine, and then there are numerous other rocky points all around the base. I only wish I could spend several weeks in the neighborhood, as the results I have so far obtained on flying visits are sufficient to make me optimistic. My next outing was on July 6th when I climbed Barnston Pinnacle (2150 ft.), the results of which were very disappointing. Certainly I found two interesting wild flowers on the summit, one of them being the Pale Corydalis (*Corydalis semper-virens*) which was new to my list, and the other the Three-toothed Cinquefoil (*Potentilla tridentata*) which I had previously found there in 1918, this being the only station I know of for the species. Concerning the ferns I can chronicle little of interest, except the fact that the Common Polypody did not belie its name. Previously I had found it in very small quantities in some five or six stations, but here it covered all the huge granite boulders at the foot of the Pinnacle, as well as being generally distributed everywhere. Other visits I hope may prove more remunerative, as of course I was only able to cover a very limited area in the time at my disposal. On the eleventh I was unexpectedly able to pay the big gorge at Coaticook a flying visit of an hour's duration only, which time was spent in locating the most suitable place for entering it, the river being deep in places and the sides perpendicular. Incidentally I found a fine cluster of that interesting little wild flower, the Harebell (*Campanula rotundifolia*), with which I was well acquainted in England, but which I had, so far, never come across in this country.

At the end of the month I paid Burrough's Falls a visit and, this being a small area, I was

enabled to examine carefully all the rocks, with no better results than on a former occasion (already reported), when nothing but the Bulblet Bladder Fern (*Cystopteris bulbifera*) could be found. The only item of interest was the locating again of a few plants of the Harebell, which my younger son had previously informed me he had seen in 1919. The following day (July 31) I went to Ayer's Cliff, and searched the rocks all around that part of Lake Massawippi known as Elmwood Park on the southern shore. Here again the Bulblet Bladder Fern was the only one in evidence, and as I unexpectedly had the opportunity of a ride to Burrough's Falls, I decided to visit that locality again, and explore the sides of the river to the south of the Falls. This was a lucky move, indeed, for I eventually came upon several large patches of that delicate little fern, the Slender Cliff-Brake (*Cryptogramma Stelleri*.)

I had almost forgotten to mention that, previous to my visit to Burrough's Falls, I spent the day of July 21st on the eastern shore of Lake Massawippi visiting Perkin's Point and the site of that rare little fern, the Smooth Woodsia (*Woodsia glabella*), which I discovered in 1920. Imagine my feelings on finding that a landslide had taken place since then, and had swept most of the largest plants away. The elevation of this site is about 550 feet above sea level, or barely half that of *Woodsia ilvensis* found on Mount Orford on June 26th. At one point on the shore I came across quite a large colony of the so-called var. *obtusilobata* of the Sensitive Fern (*Onoclea sensibilis*), with leaves in all stages of transition. As these leaves merely represent the transition from the usual sterile leaf to the fully fledged sporophyll, they should obviously bear no distinctive name.

It was not until September 19th that I again took the field in a systematic hunt for rock ferns, the locality this time being the big gorge at Coaticook. Here I came across *Cryptogramma Stelleri* and *Woodsia ilvensis*, and again three days later obtained *Asplenium Trichomanes*. In my last paper I find I omitted to mention Owl's Head (2484 feet) as being a likely place for rock ferns. This mountain is situated on the western shore of Lake Memphremagog about eighteen miles to the west of Hatley, and is of a rocky nature, but unfortunately I have not been able to visit it so far. The shores of this lake are also rocky in places, and would no doubt yield good results if properly worked. I think the foregoing notes about sum up the principal events of the seasons 1921-1922, so I will now proceed with the annotated list of the new species discovered, which have only been casually referred to so far.

SPINY SHIELD FERN (*Thelypteris spinulosa*).—This species was really discovered on August 27, 1919, but omitted from the 1920 list pending exact determination.

Thelypteris Boottii var. *multiflora* Dav.—This variety of Boot's Shield Fern was likewise discovered on August 27, 1919, but was not sufficiently identified for inclusion in the 1920 list. It was described by Davenport and is a robust form of the ordinary *T. Boottii*, which Dr. Philip Dowell (who kindly verified it for me) considers under less favourable conditions would not differ from the less robust.

THE LANCE-LEAVED GRAPE FERN (*Botrychium lanceolatum* var. *angustisegmentum*).—Although this species has not yet been found by myself, there is a record of it from Magog (Goode), and as this place comes within my area it has been included: see *Catalogue of Canadian Plants*, John Macoun, 1890, pt. 5, p. 255.

THE RUSTY WOODSIA (*Woodsia ilvensis*).—The first sight of this woolly little species is not likely to be easily forgotten. Often it is found on the exposed crests of precipices and similar dangerous places, growing in the full glare of the sun. Luckily for me, however, the site on Mt. Orford where I first found it on June 26, 1922, was a very easy one to reach, being a ledge of rock about my own height, on the top of which were several young plants growing together in close mats, the young croziers being covered with silvery white hairlike scales, which were in pleasing contrast to the darker green of the more mature fronds. The ledge was in a shady spot just off the trail, and roughly about 1,200 feet above sea level. Time would not allow of a systematic search being made, so I am unable at present to give any idea of its abundance or otherwise, but judging from the look of the surrounding rocks it may eventually be found in some quantity. On this occasion I located only about half a dozen plants, or rather mats, as no single plant grew separately. The site in the gorge at Coaticook was a very different one from that on Mt. Orford, being a cleft in the rock at the very top of the gorge, and in the full glare of the sun, the elevation being roughly about 800-900 feet above sea level. There was only one little cluster or mat consisting of about half a dozen very small plants, none of which exceeded four inches in height, and which I at first took to be *Woodsia alpina*. How we all like to imagine we have found the rarer of any two species which nearly resemble one another!

THE SLENDER CLIFF-BRAKE (*Cryptogramma Stelleri*).—This frail and delicate little fern was discovered growing on the banks of the river Nigger, about half a mile to the south of Bur-

rough's Falls on July 31, 1922. Viewing the spot from a distance, I at once seemed to know (one acquires this gift after years of field work) that here lay some secret hidden away. Everything pointed to it, the very lay of the land, the river with its rocky bed and steep-sloping, well-wooded sides, seemed to proclaim the fact. And yet it was some time before nature gave up her secret, for the very young fronds of the Bulblet Bladder Fern (*Cystopteris bulbifera*) are not unlike the sterile ones of *C. Stelleri* especially when seen growing at some height above one's head. I started work on the right bank of the river, but at first noticed nothing but *C. bulbifera* (the same as at the Falls), until a crevice in the rock high up attracted my attention, and I said, almost involuntarily, "There's *Stelleri*." I had caught sight of a fruiting frond, luckily, otherwise it was almost impossible, at the distance they were from me, to distinguish the sterile fronds from those of *C. bulbifera*, which were growing adjacent to them.

Had I known it, I might have saved myself a good deal of trouble in securing this specimen, as I afterwards found several good beds of it on the opposite bank, and obtained specimens in all stages, from the young primordial leaf, with one or more large segments, to the mature, with many and small segments. Fruiting fronds were not at all plentiful, in fact they were scarce. In contrast to the abundance of the species at the Falls, the scarcity in the gorge at Coaticook was very marked. Here only a very few plants were found, and the small colony seemed in imminent danger of being swept away at no late date by a landslide, which was apparently developing higher up.

In conclusion I should say that it is my intention to present pressed examples of all the ferns enumerated in my papers to the National Herbarium of Canada, Victoria Memorial Museum, Ottawa. This was partly accomplished in February, 1921.

WILLET CENSUS IN NOVA SCOTIA

BY R. W. TUFTS

DURING the summer of the current year (1922) a careful survey was made of the breeding range of the Willett in Nova Scotia. This was undertaken under the direction of the Canadian National Parks Branch with a view to ascertaining as nearly as possible the number of these birds which still nest in this province.

Several specimens which were taken from here were examined by Dr. C. W. Townsend of Boston and were subsequently classified by him as the Eastern Willett (*Colaptes auratus semipalmatus*) which at one time bred along the Atlantic seaboard from Nova Scotia to the Gulf of Mexico. As a result of various forms of persecution, which the species was not able to withstand, this breeding range, so far as known, is now restricted, north of Virginia, to the four western counties of Nova Scotia. Since it is not found inland, usually preferring extensive salt-marsh areas and adjacent uplands, it will be seen that the task of numbering the individuals is not as hopeless as it might at first appear. During the period when this estimate was being made there was considerable rain and fog which made it difficult to see the birds except at close range; but on the other hand it was undertaken at a time when the young were newly hatched and both parent birds were therefore much in evidence. They breed in small colonies or isolated pairs, the

nest being concealed in the thick grass and low bushes near the edge of the tide or well hidden in the upland pastures adjacent to the marshes. An allowance of three young per pair was made so that the figures which follow represent approximately the actual number, adult and young, at the end of the breeding season, and in submitting them the writer has endeavored to err on the side of conservatism. The area more definitely described includes the favorable coastal districts from St. Mary's Bay in Digby County south through Yarmouth and thence south-east through Shelburne as far as Port Mouton in Queen's County.

HEAD OF ST. MARY'S BAY, DIGBY CO. 100

This colony is readily counted with a fair degree of accuracy owing to the nature of the country and the fact of its comparative isolation from other Willet grounds. The birds in this area appear to show a steady increase during the past decade.

GROSSES COQUES, DIGBY CO. 50

The numbers here this year are disappointing in comparison with those of recent years.

CHURCH POINT, DIGBY CO. 20

There appears to be a new colony springing up here.

CHURCH POINT TO SALMON RIVER, DIGBY CO. 16

A few scattered pairs noted along this stretch of marshland.

CHEBOGUE TO LITTLE RIVER, YARMOUTH CO. 200

This section is no doubt the best favored in the province for the birds. The marshes are numerous and intricate. Birds in small colonies and scattered pairs were noted at many points. Natives here, with whom the question was discussed, contend that the Willets have increased during the past decade or two.

TUSKET MARSHES TO SURETTE'S ISLAND,
YARMOUTH CO. 150

No colonies but birds common over entire area.

ARGYLE TO VILLEGADALE (*Villagedale is in Shelburne Co.*) 100

Isolated pairs in many small marshlands rather widely separated for the most part.

VILLEGADALE TO PORT MOUTON, *which is in Queen's Co.* 100

The district between these points is similar to the above, there being no extensive areas of marshland.

Total 736

BIRD NOTES FROM THE DISTRICT OF ALGOMA, ONTARIO

BY M. J. MAGEE.

DURING the period August 2 to 6, 1922, I was on a fishing trip to some small lakes back of Goulais Bay, Lake Superior, some 20 miles nearly north of Sault Ste. Marie, Ont. The trip was made by auto to within a mile and a half of the first lake and the one where our camp was located. The country is quite well settled to within a couple of miles of the lakes, there being a number of good farms. The lakes themselves are in a heavily wooded, rocky, mountainous region.

Birds Seen:

- 7. LOON.—A pair on each lake visited.
- 51. HERRING GULL.—4. A trapper told me that a few nest every year.
- 300. CANADA RUFFED GROUSE.—Very plentiful.
- 364. OSPREY.—2. On an island in one of the lakes was a nest on top of a pine stub about 35 feet in height. I was told a pair of Ospreys had nested there for a good many years.
- 388. BLACK-BILLED CUCKOO.—2.
- 390. BELTED KINGFISHER.—At all lakes visited.
- 393. HAIRY WOODPECKER.—5.
- 394c. DOWNY WOODPECKER.—Plentiful; saw one flock of at least 20.
- 412a. NORTHERN FLICKER.—Several.
- 420. NIGHTHAWK.—7.
- 423. CHIMNEY SWIFT.—3.
- 428. RUBY-THROATED HUMMINGBIRD.—Several around camp every day.
- 456. PHOEBE.—2.
- 461. WOOD PEWEE.—3.
- 463. YELLOW-BELLIED FLYCATCHER.—2.
- 467. LEAST FLYCATCHER.—2.
- 477. BLUE JAY.—These birds were flocking. I saw numerous flocks, of which the largest contained from 35 to 40 individuals.

- 514. EVENING GROSBEAK.—1 male. Dr. Christofferson, my associate in bird work, and myself have located the Evening Grosbeak west of Sault Ste. Marie, Michigan, in summer for three years. For the past seven winters I have had a flock of from 30 to 60 at my feeding station in Sault Ste. Marie, Michigan. They usually come in the latter part of October or the first part of November and stay until the latter part of May.
- 540. VESPER SPARROW.—Plentiful.
- 558. WHITE-THROATED SPARROW.—Abundant, old and young.
- 567. SLATE-COLORED JUNCO.—A pair of adults, with three young.
- 581. SONG SPARROW.—Plentiful.
- 583. LINCOLN'S SPARROW.—A pair of adults, with two young.
- 608. SCARLET TANAGER.—A pair of old birds with two young. This is just about the northern limit of the breeding area of this species in the Great Lakes region.
- 614. TREE SWALLOW.—3.
- 619. CEDAR WAXWING.—Common.
- 624. RED-EYED VIREO.—Common.
- 629. BLUE-HEADED VIREO.—1.
- 654. BLACK-THROATED BLUE WARBLER.—1 male.
- 655. MYRTLE WARBLER.—Two flocks, about 15 each.
- 657. MAGNOLIA WARBLER.—1.
- 667. BLACK-THROATED GREEN WARBLER.—5.
- 687. REDSTART.—2.
- 722. WINTER WREN.—2.
- 735. BLACK-CAPPED CHICKADEE.—Several small flocks.
- 759b. HERMIT THRUSH.—2. On August 5 I found a nest with four eggs.
- 761. ROBIN.—A few.

766. BLUEBIRD.—About 25.

Both the Spring and Fall migrations of Warblers were very light. With the exception of the Myrtle Warbler we have seen no flocks of Warblers this year of over 10 or 12 birds.

Last year there was no food for the Winter birds in this vicinity or farther north, so, except at my feeding station, we had practically no Winter birds.

The Doctor and I spent four days in February up the Algoma Central Railway, some fifty miles north of the "Soo". Three Chickadees, one Downy Woodpecker, and one Canada Ruffed Grouse were the sum total of what we could find.

This year everything is loaded with fruit and the Winter birds should be here in force.

PROSECUTIONS—MIGRATORY BIRDS CONVENTION ACT

By Officers of the Dominion Parks Branch and Royal Canadian Mounted Police.

Reported during the period May 4th, 1922—November 23, 1922.

Joseph Bruno, Ojibway, Essex County, Ontario. Molesting Ducks in close season. Fine \$10.00 and costs.

Seizure—one .35 Caliber Revolver.

Fred Chappus, Petite Cote, Ontario. Molesting Ducks in close season. Fine \$10.00 and costs.

Seizure—One 12-gauge Winchester repeating shot gun.

Onesime Belisle, Ile Verte, P.Q. Having in possession an Eider Duck in close season. Fine \$10.00 and costs.

Seizure—One shot gun.

William Belisle, Trois-Pistoles, P.Q. Having in possession an Eider Duck in close season. Charge withdrawn.

Wilfrid Talbot, Ste. Eloi, P.Q. Having in possession an Eider Duck in close season. Charge withdrawn.

Louis Mailloux, St. Simeon, P.Q. Having in possession portions of migratory birds in close season. Charge withdrawn.

John Tremblay, St. Simeon, P.Q. Having in possession portions of migratory birds in close season. Charge withdrawn.

John Lyman Nickerson, Big Mud Island, Yarmouth Co., N.S. Having in possession a number of Terns' eggs. Fine \$15.00 and costs.

Frank Stranahan, Killam, Alberta. Hunting migratory game birds with an automatic shot gun. Fine \$10.00 and costs.

Seizure—One automatic shot gun.

George Finlay, 21 Fairleigh Crescent, Hamilton, Ontario. Having in possession a Woodcock in close season. Fine \$10.00.

W. W. Powell, 191 Mary St., Hamilton, Ontario. Having in possession a Woodcock in close season. Fine \$10.00.

EDITORIAL

BIRD SANCTUARIES ON THE NORTH SHORE OF THE GULF OF ST. LAWRENCE.

CONSERVATION is now widely recognized as an essential element in our attitude toward all wild creatures. What treasures of wild life we now possess ought to have their perpetuation assured. In the maintenance of such a policy lies the greatest wealth and the greater good, both for us and for the humanity of the future.

In the conservation of our valuable and interesting bird life, it has been found that the establishment of sanctuaries or reserves, where birds may nest or feed in assured safety, is a most effective means of protection. It is especially

applicable to sea-birds and other water-fowl, because these birds often nest habitually in concentrated colonies, where great numbers of breeding birds may be protected on comparatively small areas.

Many sanctuaries for such birds have already been established officially in North America. Up to the present time, however, far the greater number of these sanctuaries are in the territory of the United States. That country has established bird reservations on both the Atlantic and the Pacific coasts, in the Mississippi Valley, and in Alaska. Some of these include large areas.

Canada has a number of bird sanctuaries in the prairie regions of the West, but on the eastern coast of the Dominion there are but two such reserves—the Bird Rocks, and Percé Rock and the cliffs of Bonaventure Island. These two reserves, which are set aside by both the Province of Quebec and the Dominion Government, afford protection to large numbers of nesting sea-birds, especially to the picturesque Gannets, and are of much importance. Although they have been established but a few years, and have been comparatively little advertised, their potential value as attractions to tourists and summer holiday-makers may be realized to some extent from the fact that, in the summer of 1922, 767 visitors registered at Percé's two hotels and spent about \$16,000.00 in the village.

But some of the water-fowl most in need of protection on our Atlantic seaboard receive little or no aid from these two reservations, and it is highly desirable that additional sanctuaries should be established in order to assure well-protected nesting areas for such species. One of the most important of these birds is the American Eider Duck, which is a close relative of the Eider of Europe, long famous for the valuable eider-down which it produces. In Norway and in Iceland the Eider is jealously protected because of the large revenue derived from the sale of its down, which is collected from the nest. This revenue is obtained by comparatively light labor, without interference with fishing or other occupations, and it is of great importance to the welfare of the inhabitants of the regions where down is obtained. There appears to be no good reason why the Eider of our Canadian coast should not add similarly to the revenue of our people if it received proper protection and if the down from its nests were gathered, cleaned, and sold. Far from receiving such protection in the Gulf of St. Lawrence area, however, the Eider has been mercilessly hunted and its eggs have been taken at every opportunity for decades, so that it was greatly reduced in numbers. The same is true of many of its neighbors among the sea-birds. Fortunately, Provincial and Federal game laws now afford some relief from this persecution.

The chief breeding-place of the American Eider in the Gulf of St. Lawrence region is along the north shore of the Gulf. Here are thousands of barren, rocky, uninhabited islands, of all shapes and sizes, which are at present economically useless. On these islands Eiders breed in moderate abundance, in company at times with several other species of protected sea-birds, such as Razor-billed Auks, Common Murres, Puffins, Gulls, and Terns. Here is an excellent, an unusual

opportunity for the establishment of a series of sanctuaries which will be of great practical value, in that they will cause a few desolate islands, now of no use to any one, to become centers of valuable bird-life, yielding a revenue which will be a priceless boon to the poor inhabitants of the region, and which will doubtless have a marked influence in upbuilding this out-of-the-way part of the Dominion of Canada and the Province of Quebec. There is no doubt, in view of experience in European waters, that the Eider would quickly respond to the special protection which the sanctuaries would afford and would nest on the sanctuary islands in great numbers. Once the eider-down industry had become established in the sanctuaries, under government supervision, it is to be expected that the residents of the coast would voluntarily protect other islands, in order that the industry and the benefits to be derived from it might be increased.

The plan to establish sanctuaries for the protection of the birds of this coast is far from new. Lt.-Colonel William Wood, F.R.S.C., of Quebec, has repeatedly urged in print* the advisability of setting aside areas for the protection of the wonderful wild life of this region, although he advocated chiefly a large reservation in which all forms of valuable wild life would be protected. While such a reservation would be very desirable, it is felt that, as far as protection of the birds is concerned, a series of reservations of comparatively small size is preferable to one large reservation. The small reservations would be less expensive and less difficult to guard effectively, they would interfere less with the normal activities of the people resident in any area, and yet would extend their benefits more widely. Lt.-Colonel Wood obtained approval of his plan for Labrador Sanctuaries from many persons of note, including Dr. Robert Bell, the Right Hon. James Bryce, Dr. John M. Clarke, Napoleon A. Comeau, George Bird Grinnell, the Hon. Theodore Roosevelt, Ernest Thompson Seton, Alfred Russell Wallace, Sir Robert Baden-Powell, Rudyard Kipling, J. M. Macoun, and his Royal Highness the Duke of Connaught. Dr. Charles W. Townsend, who has often visited the north shore of the Gulf of St. Lawrence, has also published† a paper entitled *Bird Conservation in Labrador*, in which he states that he believes "that the whole problem can be solved most rationally and

* "*Animal Sanctuaries in Labrador*," by Lt.-Colonel William Wood, F.R.S.C., Ottawa, 1911.

† *Supplement to Animal Sanctuaries in Labrador*, by Lt.-Colonel William Wood, F.R.S.C., Ottawa, 1912.

‡ *Draft of a Plan for Beginning Animal Sanctuaries in Labrador*, by Lt.-Colonel William Wood, 1913 (?).

§ *Bird Conservation in Labrador*, by Charles Wendell Townsend, M.D., Seventh Ann. Rep. Commission of Conservation, Ottawa, 1916.

satisfactorily for all concerned by the immediate establishment of *bird reservations* and goes on to advocate the setting aside of a series of small reservations among the archipelagoes fringing the north shore. The residents of that coast themselves are well known to realize the urgent need of giving protection to the birds which mean so much to them. Almost to a man they believe that a series of government bird sanctuaries should be established in their midst. The creation of such sanctuaries would meet with wide-spread popular approval and the task of patrolling them would

thereby be rendered comparatively easy.

The time for the establishment of these sanctuaries is at hand. Both the Government of the Province of Quebec and the Dominion Government are fully informed concerning the question and have the necessary powers, and the creation on this coast by joint action on their part of a series of well-chosen reservations for birds, similar to those now under joint protection at Percé and the Bird Rocks, would be most welcome to all concerned. There is much to gain and nothing to lose by such action.

NOTES AND OBSERVATIONS

A FRESHWATER-ISOPOD NEW TO CANADA.—Since my article about these invertebrates was published in *The Canadian Field-Naturalist* for November, 1920, I have received from Prof. C. H. O'Donoghue of the University of Manitoba, Winnipeg, half a dozen specimens of Isopods "collected in a small stream, about half a mile northwest of the Biological Station at Departure Bay (Nanaimo), B.C., late in July and in August, 1921. The locality is right on the border of an old clearing that goes by the name of Hodgson's Ranch."

The specimens, when received, were dried up in the vial, but as this is the first record of freshwater isopods from western Canada, it was of importance to get them identified. I could see that it was an *Asellus*-species, but as it was little likely (see p. 148 in my article quoted above), that the central and eastern form, *A. communis* Say occurred on Vancouver Island, and as I am not familiar with the Isopods found in the far western part of United States, the specimens were sent to the U.S. National Museum, Washington, D.C., for identification. Mr. C. R. Shoemaker there has kindly identified them as *Asellus tomalensis* Harford, a species hitherto known only from the three Pacific States.

The type was described by S. J. Holmes on pp. 321-23, pl. 37, in *Proceed. California Academy of Sciences*, 3rd Series, III, 1904, from a single specimen, collected at Tomales Bay, California. Eight more specimens, collected by the Harriman Alaska Expedition at Lake Washington, near Seattle, are referred by H. Richardson to this species and described on pp. 431-33, figs. 487-89, of her *Monograph Isopods N.A.* (*Bull.* 54, U.S.N.M., Washington, 1905). Specimens were also collected in Tanner Creek, Portland, Oregon, in May, 1905, by Dr. J. E. Benedict.

The characteristics of the species are a light-brown, somewhat mottled colour, and a narrow,

elongate body. The first pair of legs are subcheliform in shape, and their propodus (the joint next to the claw) is elliptical in outline, with the inferior margin straight, and furnished with numerous short spines or stiff hairs, by which latter characters it can be distinguished from *A. communis*.

The finding of additional freshwater-isopods in western Canada would have considerable interest, and be much appreciated by the undersigned.—FRITS JOHANSEN.

A CLADOCERAN NEW TO AMERICA.—On June 21st, 1922, in a collection of Entomostraca from a marshy pool near the Biological Station, St. Andrews, N.B., I found a specimen of *Scapholeberis cornuta*, Schoedler. I placed this specimen in culture and it produced two parthogenetic young which I raised to maturity. This species has been known for a long time in Europe, but this is, as far as I know, the first record of its occurrence in America.—A. BROOKER KLUGH.

BUMBLE-BEES ON BLEEDING HEART.—When I lived in Pilot Mound (1901-16) I grew *Diclytra spectabilis* for many years and can verify Mr. C. E. Johnson's observations. (*Can. Field-Nat.*, Vol. XXXVI, No. 3, March, 1922). The lovely pink of this flower's quaint globes immediately lost tone and faded as the result of the bumble-bee's perforating jaws.—H. M. SPEECHLY.

A FRESHWATER-SPONGE NAMED AFTER PROF. JOHN MACOUN.—In the list of new species of plants and animals named in honour of the late Prof. John Macoun, of Ottawa, appearing in the obituary in *The Canadian Field-Naturalist* for September, 1920, p. 113, and at the end of his autobiography (1922) p. 304, it is stated that the list is as yet incomplete.

I therefore take the liberty to call attention to

the omission of the unique freshwater-sponge collected by Prof. Macoun in the lake-pond situated in the centre of Sable Island, N.S., and described by Dr. A. H. MacKay, of Halifax, as *Heteromeyenia macouni* n. sp., in *Trans. N.S. Inst. Scien.*, Vol. X, 1899-1900.

Apart from the fact that it commemorates Prof. Macoun's important stay upon the island during the summer of 1899, and increases the list of animals named after him from five to six, I think that the record is also of importance as showing his interest in freshwater life as well as in that upon land and in the sea.—FRITS JOHANGSEN.

ACUTENESS OF VISION IN *Pagurus arcadianus*.—The compound eye of Arthropods is extremely well adapted to perceive movement but not so well adapted for accurate perception of form. It has been shown experimentally that ants of the genus *Formica* can see large stationary objects at a distance of 10 centimeters, but cannot see small objects, that is, objects of their own size, further than 5 millimeters. Dragonflies, which, as far as known, have the most acute vision of all Arthropods, appear to be able to perceive the form of objects at 2 meters. It is not always easy, in fact it is often extremely difficult, to say what sense is involved in bringing about a certain action in an insect or a crustacean. Many reactions of these animals which are casually put down as being due to sight are found on experiment to be due to some other sense, and any exact data on this matter are of interest from the standpoint of animal psychology.

At the Atlantic Biological Station in August,

1921, we took six Hermit Crabs, *Pagurus arcadianus*, out of the shells of the Whelk, *Buccinum undatum*, which they had inhabited, and placed the crabs in one of the large shallow tanks of running sea water in the laboratory. We then placed clean, sun-dried Whelk shells at various distances from the Hermits. Up to a distance of 80 centimeters the crabs perceived the shells at once, made straight for them, "measured them up", outside and inside, with their chelae, and, if they found them suitable, promptly inserted their bodies into the shells. In this case, there is no doubt that vision was the sense involved, since the clean shells could not give off any substance which could be perceived by the chemotactic senses.—A. BROOKER KLUGH.

Cassiope tetragona IN WESTERN ALBERTA.—While collecting in the Rocky Mountains of Western Alberta in September, 1922, I was fortunate in discovering a plant whose occurrence at this point may prove interesting to many botanists. I refer to the white or moss heather (*Cassiope tetragona*). The locality was Rocky Pass just south of Mountain Park, with an altitude of about 7,000 feet. The specimen collected was in a mossy spruce woods near timber-line. It is evidently a far northern plant, for Dr. M. O. Malte, Chief Botanist of the National Herbarium, who very kindly identified this and all other botanical specimens for me, has this to say of it: "Concerning No. 673, I am glad to state that you have brought the southern limit of this northern plant a long way south. We have *Cassiope tetragona* in our herbarium from numerous places in the far north, the most southern locality, however, being from the Yukon district."—J. DEWEY SOPER.

BOOK REVIEW

THE CONSERVATION OF THE WILD LIFE OF CANADA.—(Concluded from Vol. XXXVI, No. 7, p. 140).

While game laws with longer close seasons and more restricted bag limits have done something to prevent the rapid if not appalling diminution of all kinds of game from the lordly moose to the diminutive Plover and Sandpiper, the total result in comparison with the annually increasing number of gunners and the improvement of weapons of destruction is not encouraging. Of recent years the sentiment seems to be growing among conservationists that the only hope of preserving a remnant of many species is by establishing here and there a nucleus in the shape of a park or

sanctuary where destruction shall be absolutely prohibited. Recognizing the legitimate needs of sportsmen, these oases of protection, which may also serve as forest reserves or recreation parks, may preserve species which would otherwise become absolutely extinct, and the overflow from the boundaries afford a perennial and certain supply to surrounding territory. The United States have done much along such lines, but Canada, a newer country with more unoccupied land, has as Dr. Hornaday says, "set out to get for herself a-plenty of national parks and game preserves while the getting was good. No province seemed disposed to be left behind in this conservation enterprise. As a final result, these red-spotted maps tell a great story of enlighten-

ment and progress. Until it enters its decadence, no city, State, or nation ever deconsecrates and gives back to commercial uses a park or a wild life sanctuary that has once been dedicated to the whole people as theirs."

Eastern Canada has four huge game reserves, Manitoba and Saskatchewan have thirty-one, mostly small ones; Alberta and British Columbia have seven between them, including the immense areas of Jasper Park and the Rocky Mountains Park at Banff. Maps of these parks and wild life sanctuaries are given, together with accounts of their principal attractions, and anyone in Canada or outside of it who expects ever to spend a vacation in Canada should have the book as a companion.

The Buffalo Park at Wainwright, Alberta, is a most successful experiment. A few hundred buffalo purchased in Montana in 1903 have increased to more than five thousand and are now taxing the resources of the park. The whole story of the former abundance of the buffalo and its tragic extermination as a wild animal is graphically told, the future of the buffalo is discussed, as well as the results of cross-breeding with domestic cattle. An area southwest of Medicine Hat has been fenced to include a herd of wild antelope on their native range, and they are increasing, an encouraging sign, as antelope have never thrived when captured and confined. The extended chapter on the game animals of Canada, describing their distribution, habits, and present numbers, will be a delight to the general reader. Much illuminating knowledge is given in regard to the increase of the common deer after the settlement of the country, and the book also sums up the tangible part of the mass of floating data regarding the numbers and possibility of utilization of the barren ground caribou and gives a fair presentation of the present knowledge of the reindeer industry in Alaska and its applicability to Canada. The rapid shrinkage in the numbers of the muskox is lamented and Dr. Hewitt's share in securing a permanent closed season for this interesting and valuable animal is discussed, as well as the latest proposals for the potential utilization of the muskox in a domesticated state.

Under the heading of game birds and larger non-game birds of Canada, particular attention is given to those birds which have been recently so reduced in numbers as to receive special protection under the Migratory Birds Convention while the other more important game birds are fully discussed. An excellent chapter is devoted to birds in relation to agriculture. Under this are most useful descriptions of methods of attracting birds, lists of native trees and shrubs bearing fruits

attractive to birds, methods of building bird-houses, destruction of bird enemies, and an account of the subject of bird sanctuaries. In another chapter the enemies of wild life are given detailed attention, the most important feature in this line being the wolf and coyote problem as affecting big game and the livestock interests.

Taken as a whole the book may be said to contain something of interest to every person who is interested in any phase of wild life and there are few who can not qualify in that class. The year since the above was written has conclusively demonstrated to the writer its great value as a reference book and any Canadian library, public or private, is incomplete without it. The scientist, naturalist, and teacher find in Dr. Hewitt's book facts not assembled elsewhere, and made clear by maps and charts; the conservationist and law-maker find arguments for justifying their claims, and all Canadians may take pride in reading that their country has done so creditably in the world-wide movement for conservation, and feel gratitude to Dr. Hewitt, the lamented friend of man who did so much for the cause of conservation and so gracefully and graphically recorded it.—
R. M. A.

CONTRIBUTIONS TO CANADIAN BIOLOGY, 1906-20
(*Supplement to Annual Reports of the Departments of Marine and Fisheries and Naval Service, Ottawa, 1912-21.*)

The first two (1901-1902-05) numbers or volumes of this important Government publication dealing with marine and freshwater biology have been reviewed in the *Ottawa Naturalist* for May, 1902, and October, 1907, where also the history and organization of the Biological Station at St. Andrews, N.B., is recorded.

Since then, and until the changing of the editorial office from Ottawa (Prof. Prince), to Toronto (Prof. McMurrich), in 1921, six volumes (1906-10, 1911-4, 1914-5, 1915-6, 1917, 1918-20) have appeared, still further increasing the scientific value of these reports, and showing the great variety of subjects studied by the contributors. In addition to the Atlantic Station, two more biological stations were established, one at Departure Bay (Nanaimo), B.C., and the other at Georgian Bay, Ont. The latter was, however, discontinued after some years, as similar work is being done by institutions in Toronto, and the collections made deposited in the Government museums. The Biological Board of Canada has however up to this day, continued the investigations of fishery-problems in the Great Lakes and published the results thereof.

Apart from the many treatises on Algæ and

Diatoms, botanists will find several, original articles on plants. Thus the 1906-10 volume includes a paper on the flora of the St. Croix River-valley and Passamaquoddy Bay region, N.B.,* discussed from an ecological point of view; and the 1911-14 volume (Fasc. II) three papers on the plants of Georgian Bay.

Geologists will be particularly interested in two articles about the geological environments of the Biological Stations at Departure Bay, B.C., and St. Andrews, N.B., in the 1906-10 and 1915-16 volumes respectively. And entomologists will appreciate the three papers on Odonata and Ephemeroidea (both adults and immature stages) in the 1911-14 (Fasc. II) volume.

The vast majority of articles in these six volumes treat however of course hydrography (in its widest sense), marine biology and fishery-problems. To give an idea of the great variety of subjects we will first take those dealing with physiology, chemistry and bacteriology.

Experiments with freezing and thawing of live fishes are recorded in the 1911-14 volume; while examinations of the content of iodine, etc., in marine animals and algæ are also found in the 1914-15 volume. The 1917 and 1918-20 volumes contain half a dozen treatises on the putrefaction, bacteriology, etc., of fresh and canned fish, questions as important for the consumer as for the packer.

In the line of hydrography, five articles on the temperatures, salinity, etc., of the water in the Bay of Fundy and Passamaquoddy Bay will be found in the 1906-10, 1914-15 and 1917 volumes; while the waters at Departure Bay, B.C., are treated in the 1914-15 and the 1918-20 volumes. It is a well known fact, that no real understanding of the movements of the fishes, their breeding-habits, etc., is possible without an examination of the surroundings in which they live; quite apart from the importance of hydrographic investigations for meteorology, sailing, etc.

As for the microscopic life (Plankton) floating in the sea and in fresh-water, the most primitive forms (Phyto-plankton) occurring in the Bay of Fundy are recorded and discussed (distribution, cultures, etc.), in the 1906-10, 1911-14, 1915-16 and 1918-20 volumes; the last named volume also contains an article about the Diatoms from other Canadian localities, viz.: the Magdalen Islands, Montreal, Georgian Bay, and Lake Winnipeg. The Zoo-plankton forms occurring at St. Andrews, N.B., are discussed in the 1911-14 and 1915-16 volumes; and the 1906-10 volume contains an account of the different bivalve Molluscularvæ at the Atlantic coast of Canada. Also the distributions of a peculiar family of pelagic worms, and of floating Tunicates, at the Atlantic coast, as

shown by the collections made by the Canadian Fisheries Expedition, 1914-15, are described in the 1918-20 volume.

The importance of the study of plankton-forms need hardly be emphasized; the more minute and primitive forms serve as food for the larger ones; and practically all the marine animals, from the fishes down to the lower invertebrates, have a pelagic stage of shorter or longer duration, during which they contribute to the make-up of the plankton. Besides the plankton forms the food for some of the largest whales and sharks, and for certain fishes, such as the herring, etc., of enormous economic importance.

As to the bottom-life, the economic value of the kelp-beds of the British Columbia coast is discussed in the 1914-15 volume; while marine algæ from Passamaquoddy Bay, N.B., are recorded and described in the 1915-16 and 1918-20 volumes. Accounts of the marine invertebrate fauna in general will be found in the 1906-10 and 1917 volumes, so far as the Atlantic coast is concerned, and in the 1918-20 volume for Departure Bay, B.C.

Coming to the different groups of invertebrates, observations on the Actinaria (sea-anemones) occurring at St. Andrews, N.B., are found in the 1906-10 volume; while the 1917 and 1918-20 volumes contain two papers (the one an illustrated semipopular key) on the Hydroids of eastern Canada.

The freshwater-leeches and polyzoa (Bryozoa) occurring in Georgian Bay, Ont., are recorded in the 1911-14 volume (Fasc. II).

The 1911-14 volume also contains an account of the freshwater-molluscs of Georgian Bay, Ont., while the pearly freshwater-mussels of Ontario are discussed in the 1917 volume as to their economic value.

A list of the marine molluscs found at St. Andrews, N.B., will be found in the 1911-14 volume (Fasc. I) and the 1917 volume contains an interesting account of the ship-worm (*Teredo navalis*), so destructive an animal to the wharves, etc. Five papers dealing with oysters and clams in the Maritime Provinces (Gulf of St. Lawrence) will be found in the 1906-10, 1914-15, and 1915-16 volumes, treating of their economic importance, proper surroundings, diseases, etc.

Turning to Crustacea we will find two important contributions to our knowledge of the freshwater forms of Ontario in the 1911-14 volume; two other papers on the marine forms occurring at St. Andrews, N.B., in the 1906-10 and 1911-14 volumes; and a fifth on the marine Decapods at the coasts of British Columbia in the 1906-10 volume. The most valuable of all our crustaceans, the lobster, of course also comes in for attention; and six articles on its physiology, histology, diseases, surroundings, etc., will be found in the 1906-10, 1914-15, 1917, and 1918-20 volumes. The fragility of the very young lobsters, and their susceptibility to less perfect surroundings add to the importance of these papers.

As to the simple looking, but highly organized Tunicates (sea-squirts), a detailed description, accompanied by twelve beautiful plates, of Ascidiacea collected in British Columbia and at Herschel Island, Arctic Canada, recording a number of new species, will be found in the 1906-10 volume.

The different parasites affecting fishes are of course also treated. Thus, of crustaceans, copepods from Vancouver Island are described in the 1906-10 volume, and from the Bay of Fundy in the 1911-14 volume. An interesting tapeworm (*Cestod*) from Black Bass is described in the 1911-14 volume; while the primitive parasites (*Sporozoa*) affecting fishes at the Atlantic coast are recorded in the same volume (Fasc. I), and in that for 1914-15.

Results of an investigation into the different kinds of bait used by fishermen at the Atlantic coast will be found in the 1906-10 volumes; while the 1917 volume contains a long, illustrated report on the investigations of the herds of sealions frequenting the Pacific coast of Canada, a rather controversial subject, as the fishermen claim that much damage to the fisheries (particularly to the salmon) is done by these seals.

Fishes and fisheries in a stricter sense are of course treated in a number of articles and reports.

Thus the 1911-14 volume contains a long account of the freshwater fishes of Georgian Bay, Ont., illustrated by plates; while the freshwater and marine fishes* of Prince Edward Island are recorded in the 1906-10 volume. In the 1917 volume an annotated list of the fishes of the vicinity of Magdalen Islands and the Nova Scotia coast opposite will be found.

Treatises dealing with the appearance, life-history, and economic value of certain fishes are well represented. Thus, besides a description of a new Cottoid (sculpin) from Departure Bay, B.C., in the 1916-10 volume, the Pacific Halibut-fisheries are treated in the 1914-15 volume; and the biology, etc., of the various kinds (Spring, Coho, Sockeye, Dog, Humpback-) of Salmon occurring in British Columbia will be found in four articles in the 1915-16, 1917, 1918-20 volumes. Of fishes occurring at the Atlantic coast of Canada, the utilization of the Selachians (dog-fish, etc.) is discussed in the 1917 volume; the eggs and larvae of Halibut in the 1914-15 volume; and the life-history (as learned from scale examinations) of the Cod, Hake, and Haddock, and the migration of Eels also in the 1914-15 volume. The 1915-16 volume contains an article about the colour-pattern of cod-fishes; the 1917 volume another about the growth of the Pollock; and the biology of the Mutton-fish (*Zoarces anguillar*) is treated in the 1918-20 volume.

To enumerate the names of the different authors is hardly necessary; they are practically all Canadian workers, and their writings mostly embody the results of their own investigations at the two (three) Biological Stations; often they are authorities upon the particular subject they write about. After the acquisition of the large motor-launch, *Prince*, specially constructed and fitted out for marine investigations, it has been possible to utilize it for research work far away from the St. Andrews station, where the main body of workers stay during the summer and have smaller boats at their disposal. Thus the work goes on, during the summer, both in the Gulf of St. Lawrence, along the outer coast of Nova Scotia, and in the Bay of Fundy; and now everything is running smoothly. Each of the two stations is in

charge of an efficient curator of scientific standing and is well patronized by workers from all over Canada. It is well to remember the great and successful work accomplished by the former chairman and present secretary-treasurer of the Biological Board of Canada, Prof. E. E. Prince, Dominion Commissioner of Fisheries, who has the main credit of the creation and proper functioning of this institution.

As chairman of the Board he arranged for the upkeep of the biological stations and the selecting of the workers, and also for the planning and carrying out of the investigations; as individual worker in research studies at the stations he showed the way and inspired his colleagues; finally in the onerous work of gathering in and editing his reports resulting from the investigations he was tireless in his endeavour to make the volumes published worthy of Canadian Science. The important work of making outsiders appreciate the work being done by the Board for the benefit of one of the principal resources and industries of Canada has also largely devolved upon him.

It is perhaps worth mentioning that the Biological Board of Canada, the establishment of which, in 1898, has been recorded in the *Ottawa Naturalist* for May, 1902, p. 46, is made up of a dozen representatives from the principal universities in Canada; and though in the course of time certain of its members have been replaced by others the character and purpose of the Board is the same as formerly. Marine Biology, Anatomy, Physiology, Botany, Geology and Chemistry are all ably represented upon the Board; and though its members serve without pay, and only meet occasionally, it is decidedly one of the most useful and successful institutions established by the Canadian Government during the last thirty years.

If it is true that the value of a particular Department is not measured by the number of people employed in it, nor by the amount of printed matter emanating from it; but by economic and efficient administration, and by the courageous and intelligent tackling of great practical and scientific problems, resulting in important contributions to our knowledge of the resources of the country, then the Biological Board of Canada occupies a place in the front rank. Similar institutions in the United States are supported by private means, and the same is mainly the case with the biological stations in Europe. In other countries instruction of university-students is an important part of the work; in Canada however the effort is devoted solely to original research by post-graduates, and thus the result is more immediate.

Is it too much to hope that the various provinces of Canada, who are so insistent upon the resources within their borders, to a far greater extent than hitherto will recognize their responsibilities as to the scientific investigation and development of them? Investigations of the many important bodies of fresh water in southern Canada could at least be done by the provinces at reasonable expense, as shown by the Universities of Toronto and Manitoba, leaving the Great Lakes and the sea (where international cooperation is often necessary), and the arctic territories to the Dominion Government.—F. J.

*In the table of contents the title of this paper is given as Notes on the Fauna (should be Fishes) of Tignish, P.E.I.





The Canadian Field-Naturalist

VOL. XXXVI

OTTAWA, ONT., DECEMBER, 1922

No. 9

THE BIRDS OF NORTH BAY, ONTARIO, AND VICINITY IN 1904

BY STUART L. THOMPSON

NORTH BAY is situated on the northeast shore of Lake Nipissing, in the District of Nipissing, Province of Ontario. At the time of my acquaintance with it, 1904, it was a town of some 3,500 inhabitants of French-Canadian and British stock, with a sprinkling of Indians, living for the most part in the outskirts, the territory to the west of the lake being an Indian reserve.

Speaking generally, the country surrounding the town slopes very gently towards the lake, is fairly level and extends north and east some four miles where it rises abruptly into a sort of bushy, rounded cliff between 100 and 200 feet high. This ridge extends in a south-east to westerly direction, forming a sharp contour on the sky line. In the south and east it rises abruptly, but it is gradually lost towards the west in the general level. Below this ridge is the flat sloping surface covered with low woods that form the immediate background to the town. North and east of the town the country is flat or gently rolling, with more or less stony mounds, and dips down into a damp, boggy thicket which becomes locally grassy muskeg. To the west the same character of country prevails except that the mounds become rocky hills, sometimes of bare rock with little vegetation of any size. Lake Nipissing, occupying the south and west outlook from the town, is 18 miles in length and empties into Georgian Bay by way of the French River. It is generally supposed to be a treacherous lake due to its shallowness and the sudden wind storms to which it is subject, which raise comparatively rough water. For many miles along the north arm of the lake the shore is a level sandy beach, but to the west it becomes rocky and wooded.

On the south side of the town flows Chippewa Creek, a small stream but a few feet across. Its course is very crooked and its banks for the most part are covered with alders and similar shrubbery. It rises to the north in the low-lying woods behind the town. A mile or so west of town is Chien Creek, a much larger stream, rising in the rocky hills and flowing through rock channels and small

gorges. Like Chippewa Creek it empties into the lake.

Speaking generally the country about North Bay could at that time be called rocky woods. The only exception to this description was the low-lying grassy and bushy marsh. The only spot that could be called a field was a certain clearing of 40 or 50 acres in extent, grass grown between great pine stumps, bounded by the lake on one side and by dense woods and the town on the others. Here alone were seen such species as Vesper Sparrow and Meadowlark.

The forest was a mixture of coniferous and deciduous trees. The commoner of the former species were Red and White Pine, Cedar and Balsam Fir, with Tamarack in the damp parts. Of the latter, Black, Yellow and White Birch; Maple, Cherry, Poplar, Willow, Alder, Dogwood and other of lower growth were found. The character of the country on the whole is very suitable for both migrant and resident birds.

The climate does not differ greatly from that of Northern Ontario generally, and is not greatly modified either way by the immediate presence of Lake Nipissing. The summers are short and hot but the nights are always cool enough for comfort. June and July are the hottest months; August, especially towards the end, usually suggests the return of autumn. The winters are long and fairly cold. Heavy night frosts begin in October. November is cold and December usually sees winter fairly well begun. January and February are the coldest months. Temperatures of 40 and 45 degrees below zero are not rare and the snow lies about two feet deep. Towards the end of February the sun shines brightly and the days appear almost mild. In March, real winter may be considered to be past. April is a rather cold spring month and May is likely to be showery.

1. *Podilymbus podiceps*. PIED-BILLED GREBE. —Common summer resident in the reedy parts at the west end of Lake Nipissing. August 29, I secured two specimens.

2 & 3. *Larus argentatus* and *L. delawarensis*. HERRING and RING-BILLED GULLS.—Both tolerably common summer residents on Lake Nipissing.

4. *Mergus serrator*. RED-BREADED MERGANSER.—Very common around Manitou Island, Lake Nipissing, where in August we constantly saw adults with young. They rarely permitted close approach, pattering off over the water as we approached. The young, though unable to fly were well able to care for themselves. It was no rare thing to come upon a flock of ten or fifteen Mergansers as our canoe rounded a point. We secured one specimen which proved to be this species. The only adults seen were females, the males never appearing.

5. *Ardea herodias*. GREAT BLUE HERON.—Common summer resident. Frequently seen on the lake shore and occasionally flying overland. In August I found them very abundant in marshes and on rocky islets in the West Arm of Lake Nipissing.

6. *Marila* sp. SCAUP DUCK.—A Scaup Duck frequently seen on the lake in September. Whether Greater or Lesser Scaup could not be determined.

7. *Botaurus lentiginosus*. AMERICAN BITTERN.—Rather rare. Seen only on two occasions in low-lying open muskeg country. There is not sufficient open marsh to lead one to expect many Bitterns.

8. *Pisobia bairdi*. BAIRD'S SANDPIPER.—The only actual record I have of Baird's Sandpiper is that of a specimen collected September 7 on the shores of Lake Nipissing. This day I found shore birds quite common and saw several small flocks of Baird's. Although I have seen Sandpipers in spring that might be Baird's I have no certain spring record.

9. *Ereunetes pusillus*. SEMIPALMATED SANDPIPER.—Found commonly in the fall. A specimen collected September 7. I think I have seen it in spring but never certainly identified it then.

10. *Actitis macularia*. SPOTTED SANDPIPER.—Common summer resident both on the lake shore and on muddy flats of the creek.

11. *Oxyechus vociferus*. KILLDEER.—Owing to the lack of open fields that flood and remain muddy into late spring the Killdeer is rather rare in the North Bay country. Occasionally near the shore of the lake I have heard or seen it flying over. The only time I ever met the Killdeer at close range here was in June, 1903, when I came upon one amongst many Spotted Sandpipers on the beach near the mouth of a sewer.

12. *Circus hudsonius*. MARSH HAWK.—Common summer resident. It was often seen winging back and forth over the muskeg country or the

rough open clearings. Many were in high plumage, being quite pearl gray. In fall it is seldom seen even in immature plumage.

13. *Accipiter velox*. SHARP-SHINNED HAWK.—Rather rare summer resident. I have seen the Sharp-shin only on rare occasions and in the more or less wooded regions where his small size and long, slim appearance helped to identify him.

14. *Buteo platypterus*. BROAD-WINGED HAWK.—Rather rarely seen. On several occasions I have seen Hawks that might have been Broad-winged but only when the familiar "Chuck-kee-e-e-e" was heard was I sure of the species.

15. *Haliaeetus leucocephalus*. BALD EAGLE.—Rather rare. Saw one pair one day while walking to Powassin. Though they were flying over I could see the markings plainly. In August on French River I saw a fine specimen flying back and forth for some minutes over the marsh, when the white head and tail were quite easily seen.

16. *Falco sparverius*. AMERICAN SPARROW HAWK.—Common summer resident. This species is often seen sitting on a stump top or telegraph pole overlooking a stretch of rocky clearing below. It is more common in early fall. One specimen shot September 9th had in its stomach the remains of a small rodent. On several occasions I have found the Sparrow Hawk in tree tops in deep woods but generally it is a bird of the open clearings.

17. *Pandion haliaetus*. FISH HAWK.—The Osprey is quite common on Lake Nipissing. Several seen on a trip on the French River. A female was collected August 30th at the west end of Lake Nipissing.

18. *Ceryle alcyon*. BELTED KINGFISHER.—Common summer resident. Kingfishers are always to be seen on the lake shore or near Chippewa Creek. They were quite common on Manitou Island, some six miles from town in Lake Nipissing.

19. *Dryobates villosus*. HAIRY WOODPECKER.—Unlike the Downy, the Hairy is rather rare in summer, being found only occasionally, and being then solitary and silent. On the approach of fall it becomes common and is often seen flying over the brûlé, uttering a sharp "wick" and sometimes following the note with a rolling call.

20. *Dryobates pubescens*. DOWNY WOODPECKER.—Very common summer resident. It may be seen in almost any wooded part of the country, often in twos and threes. Throughout the summer it is common and in early fall abundant—certainly the most numerous of the Woodpeckers here.

21. *Picoides arcticus*. ARCTIC THREE-TOED WOODPECKER.—The three-toed Woodpecker can not be considered a common bird in this region.

I occasionally met with it in winter, working away on tree trunks in silence except for the noise of its own chiselling. I never heard it utter a note. The only fall record I have is that of one seen September 22, 1904. One collected at Toronto, October 27, would give rise to the belief that the Woodpecker was working southward.

22. *Sphyrapicus varius*. YELLOW-BELLIED SAPSUCKER.—Fairly common in open deciduous woods in spring, but it becomes scarcer as the season advances. No fall records.

23. *Phloeotomus pileatus*. PILEATED WOODPECKER.—Rare summer resident. I have only one record of this large Woodpecker though it is distinctly at home here as evidenced on canoe trips in various parts of adjacent country from 1907 to 1922, when it has been frequently seen and more often heard.

24. *Melanerpes erythrocephalus*. RED-HEADED WOODPECKER.—Found quite frequently in the more open parts of the country. I never saw it in the deep woods with the Hairy and Downy Woodpeckers but always in clearings, where it finds upright stumps of trees, 10 to 30 feet high, for resting and nesting sites. Another common place for it was on the telegraph poles along the railway lines, which of course are "upright stumps" to them as much as those in the other clearings. It is usually silent except for its *cherr*, which it repeats from an elevated spot.

25. *Colaptes auratus*. FLICKER.—Rather rare summer resident. Although in a well-wooded country I did not find Flickers very abundant. I fancy they prefer more cultivated regions.

26. *Chordeiles virginianus*. NIGHTHAWK.—Abundant summer resident. This species is a common object in the evening sky from May until the end of August, where it spends most of its time in "booming". Occasionally through the day I flushed Nighthawks in the open woods, when they were nearly always silent. Several flights were seen in the late summer or early fall (September), when many passed overhead erratically in silence.

27. *Tyrannus tyrannus*. KINGBIRD.—Common resident from late April to September. Generally seen near town and in the more settled parts.

28. *Myiarchus crinitus*. CRESTED FLYCATCHER.—Rather rare summer resident. I found this flycatcher in a clump of tall trees known as "The Park" several times, uttering its usual note. I cannot recall having seen it elsewhere in the neighborhood or in the fall.

29. *Sayornis phoebe*. PHOEBE.—Tolerably common summer resident. While walking along the railroad track, the best road for any distance

in the neighborhood I have often observed it on the telegraph wires and have thought that it seemed as if it had learned that along the tracks it could find suitable culverts for nesting. Occasionally I have found the Phoebe some distance from any bridge or clearing, generally in some low-lying land, where it probably nests in the roots of upturned stumps.

30. *Nuttallornis borealis*. OLIVE-SIDED FLYCATCHER.—Tolerably common summer resident. This bird is more often heard than seen. His high clear whistle can readily be heard half a mile away. It is generally to be found on a dead tree-top or similar commanding position, noisily repeating a lusty "*qui-qui*" or which it frequently continues into the loud call of "*qui quee-quee*". Like the Chebec, the Olive-side ceases to sing or call as summer closes and about the end of August disappears from these northern haunts.

31. *Myiochanes virens*. WOOD PEWEE.—Tolerably common in the taller and more open woods. I never failed to find it in the grove by the lake front commonly known as "The Park". It was generally in full song and evidently nesting for it remained in the same vicinity throughout the entire season.

32. *Empidonax trailli*. TRAILL'S FLYCATCHER.—Common summer resident. This Flycatcher can always be found in the dense low bushes of the muskeg country. I found it abundant any time I walked any distance along the railway tracks. It is heard even more often than seen. Its note can be readily recalled by the words "*Right here*". I have never heard any other note nor pretense of flight song such as the Chebec sometimes utters. So characteristic of the flycatcher family is this bird's note that I recognized it as such before I first saw the bird. The scrubby country, thick with low bushes, that it inhabits also assists in its identification.

33. *Empidonax minimus*. LEAST FLYCATCHER.—Abundant summer resident. The Chebec may be seen at all times in his bushy haunts, constantly calling his snappy "*Chebec*." On many occasions I have seen him execute a flight song after he had been *chebecing* for a long while. He springs into the air and utters a "*Too-oorle too-oorle*" several times, ending in his usual "*chebec*," which identifies him at once. With the coming of summer the Least Flycatcher becomes silent and by early fall has slipped away from the northern woods.

34. *Otocoris alpestris*. HORNED LARK.—There is very little country about North Bay suitable for the Horned Lark. I saw it once in the rough clearings and twice met it in the large open field called "The Park", near the lake. Probably a pair nested there the season of 1904.

35. *Cyanocitta cristata*. BLUE JAY.—Throughout spring and summer the Blue Jays are fairly common, but for the most part silent. In September, when the first chilly days come, they become more or less abundant in small roving flocks in woods and clearing and are more noisy.

36. *Perisoreus canadensis*. CANADA JAY.—In my experience the Canada Jay is not a summer resident about North Bay. Although I spent much of the summer of 1903 and all of 1904 in this vicinity, it was not until late in September, 1904, that I actually saw the species. Then while grouse-shooting I came suddenly upon a little flock of them in the thick woods. Although they kept in the higher branches of the trees, the one I secured had a grasshopper in its stomach which had probably been secured in a neighboring grassy clearing. Several were seen during the winter and occasionally they appeared in the town gardens where they seemed quite at home.

[*Corvus corax*. AMERICAN RAVEN.—Although I never positively identified Ravens at North Bay nor had opportunity for directly comparing suspected birds with Crows, I saw several times Crow-like birds with an apparently different flight, which croaked hoarsely or grunted instead of cawing clearly.]

37. *Corvus brachyrhynchos*. AMERICAN CROW.—Tolerably common permanent resident. Seen in flocks in varying numbers all the year, particularly in summer on the lake shore where doubtless they are attracted by the refuse thrown upon the beach.

38. *Molothrus ater*. COWBIRD.—A rather rare summer resident. During the whole season of 1904, I saw only three Cowbirds. I attribute this to the densely wooded nature of the locality, there being but one open pasture field where it would be likely to find cattle, in the proximity of which they are usually seen.

39. *Sturnella magna*. MEADOWLARK.—Very rare summer resident, probably for the same reason that the Horned Lark is rare—lack of open country. The only actual record I have is that of a specimen in immature plumage collected September 21st. I thought I had seen it previously on the 19th. This was in a large field called "The Park". I think the Meadowlark may be found near Azilda on the C.P.R., where there is much more open country and some crops are raised.

40. *Euphagus carolinus*. RUSTY GRACKLE.—The Rusty Grackle appears to be a transient visitant. I first met it suddenly in a large flock in September in a rough clearing. They were all in the "rusty" plumage and appeared restless, moving hastily through the clearing. The whole flock kept up a constant babbling chorus which could hardly be called a song. From that date

on they became more and more common until at length it was no rare thing to meet a flock of fifty or so at any time.

41. *Quiscalus quiscula*. BRONZED GRACKLE.—These Grackles are always abundant on the lake shore and by Chippewa Creek where they appear to find plenty of food along the shore. They live chiefly upon refuse and drowned insects sometimes thrown up by the waves in great numbers. Also seen in The Park. As fall approaches they become less common.

42. *Pinicola enucleator*. PINE GROSBEAK.—Very common winter resident. Small flocks of from five to ten might be found almost any day here and there in the woods. They were generally seen near the ground, feeding on berries and buds that showed above the snow. A common food in Manitoba is Wolf-berry, *Symphoricarpos occidentalis*.

43. *Carpodacus purpureus*. PURPLE FINCH.—Abundant summer resident. To be seen at all times in the summer, especially amongst the deciduous trees. They have a marked preference for Poplars, coming, probably, in search of insects that are attracted by its sweet smell when it is in flower. In May and June they are especially abundant and in full song but as fall approaches they become less noticeable or depart.

44. *Loxia curvirostra minor*. AMERICAN CROSSBILL.—A few seen on one occasion during the winter of 1903-4.

45. *Acanthis linaria*. REDPOLL.—Abundant in winter and early spring. Although I have seen large flocks of these little birds in the thickets and on edges of clearings I was never able to distinguish any but the common variety among them. My earliest winter record is the middle of November (1903).

46. *Astragalinus tristis*. AMERICAN GOLDFINCH.—Common summer resident. The Goldfinch is most abundant in May and June, decreases in number as summer advances, but in fall is still tolerably common in loose roving flocks. From May till July they are in full song but as August comes and fall approaches their song is replaced by a plaintive two-note call. I have no record of the Goldfinch in this country in winter but there is no reason why they should not occur as do the Redpolls which they resemble in habits.

47. *Plectrophenax nivalis*. SNOW BUNTING.—Found very commonly along the beach in late fall before the heavy snow has fallen. In small companies or a few pairs they run along the frozen sand as shore birds might. Occasionally I have found them in the clearings inland.

48. *Passerculus sandwichensis*. SAVANNA SPARROW.—Although tolerably common, it is

naturally restricted to the small areas of open country present—clearings, fields and grassy muskegs. In such places it remains throughout the summer in song and evidently breeding.

49. *Zonotrichia leucophrys*. WHITE-CROWNED SPARROW.—The White-crowned Sparrow in its season is one of the most abundant of the Sparrows. It arrives in April with the White-throats and rivals that bird in both numbers and song. As the season advances, it becomes less numerous and is met with only occasionally in summer. Again in September it appears and becomes common with many other sparrows and granivorous birds. The well-marked adults during this month are conspicuous but the duller immatures are far in the majority in point of numbers, although there is no mistaking even the latter, for their lively actions and choice of haunts at any season or in any plumage are characteristic. During the spring migration here, the White-crown sings a clear, plaintive little song somewhat resembling that of the White-throat but lacking the pure whistled quality. This is sometimes heard during the fall migration but the most usual note in September is a quavering, hesitating warble into which odd notes, *chick* and *tweet*, are brought. The whole is sung in an undertone, not delivered clearly and freely. I have heard this song a number of times from the immature but I think the adults utter it as well.

50. *Zonotrichia albicollis*. WHITE-THROATED SPARROW.—The White-throated Sparrow is certainly one of the most abundant birds of the northern woods. It seems to be everywhere at all times. Though frequently seen, it is still more often heard. Sitting on a log one day with watch in hand I counted 25 White-throat songs to the minute. And this goes on hour after hour throughout the day. It is difficult to realize that any species could be so persistent a singer. It is no rare thing to hear the White-throat in the darkest hours of the night in May and June. The season of song continues until the middle of July. It is not unusual to hear it in August and even in September, especially if it is encouraged by a whistled imitation, a thing not difficult to do. In spite of this plenteous singing I have never seen a single bird indulge in a flight song of any kind. The clear, fine, controlled character of his song seems not to lend itself to flight singing. If we recall the bubbling song the Bobolink utters on the wing and compare it with the deliberate notes of the White-throat we may surmise that special vocal qualities are best adapted to flight singing. The White-throat nests here on the ground. In September it joins the sparrow flocks in the weedy clearings where it compares favorably with all the

other birds in numbers but rather surprisingly does not exceed them as would be expected by its abundance in spring.

51. *Spizella monticola*. TREE SPARROW.—A transient visitor, common in spring and abundant during September and October. Generally when present they are one of the most abundant species in the sparrow flocks in the weedy clearings. I have seen them occasionally in small flocks in early winter after the other sparrows have departed.

52. *Spizella passerina*. CHIPPING SPARROW.—Common summer resident. The Chipping Sparrow is perhaps the commonest bird found about the outlying houses of the town. The nest is common in shade trees and bushes in the gardens. I recall a terrific thunder and hail storm on June 21st that raged for half an hour or more, tearing limbs from trees and breaking windows, which did not drive a female "Chippie" from her nest in a maple tree near the window. After it was all over I looked into the nest and found one young bird and an egg.

53. *Junco hyemalis*. SLATE-COLORED JUNCO.—The Juncos appear about the middle of April and become very common in the more open woods. They are sociable and can be seen at almost any time in large loose flocks "foraging" about the ground. During this time they are constantly uttering their twittering note which from the whole flock has the effect of quite a chorus. About May they disappear in a body but all through the summer an occasional Junco may be met with and I found one pair nesting. Again in the fall from September to late October they are common if not abundant but are not so leisurely in their movements and commonly associate with White-throats, White-crowns, Chipping and Tree Sparrows in rough clearings.

54. *Melospiza melodia*. SONG SPARROW.—Contrary to what might be expected, the Song Sparrow is not an abundant bird here. The country appears to be too well wooded for it, with not enough patches of open woods and hedgerows. However it can safely be termed a common summer resident.

55. *Passerina cyanea*. INDIGO BUNTING.—A rare summer resident. June 10th, I collected a singing male on a rocky hill above the town and later in the day I saw and heard several others about the same spot. This was the only occasion on which it was noted.

56. *Bombycilla cedrorum*. CEDAR WAXWING.—Tolerably common through May and June but seems to disappear in early summer except for an odd pair or so. It was not because they became more silent in summer, for when is the Waxwing

otherwise than silent? In August they appeared again in increased numbers and besides living on the ripening wild fruits they became more or less flycatcher-like, sallying forth at passing insects and catching them quite readily in the air.

57. *Vireosylva olivacea*. RED-EYED VIREO.—Abundant summer resident from May to the latter part of September. Its persistent warble is one of the commonest sounds of the woods. They often sing well into August. Several nests were found.

58. *Lanius solitarius*. SOLITARY VIREO.—I have met with the Blue-headed Vireo only on two occasions, both in May. I was first attracted by its song which seemed to my ear somewhat like that of the Red-eyed Vireo yet sufficiently different to induce investigation. There were longer pauses between the bars. I found it in a small poplar and easily identified it. A day or so later I recognized another. They did not remain in the neighborhood through the summer or I probably should have found them again.

WARBLERS.—There is no group of birds more abundant than the Warblers. Every clump of thicket or woods had its own population of birds and amongst them were often several kinds of Warblers. When I arrived in May, many of the trees were just bursting into bud but the Warblers were already in force and continued so into July. The whole bird population seems to dwindle in August so that with the exception of the Redstart and the Myrtle the Warblers were nearly missing altogether. About the middle of September the woods became again tenanted with the lively little birds. In the spring they are constantly in song, and the males are in gaudy plumage, but the majority of fall birds are in immature or female plumage and silent, and difficult to find or to identify when discovered. In general these remarks apply to all the Warblers noted here. I arrived at the conclusion that most of them are transient visitors at North Bay, passing beyond to breed. The only actual breeding records I have for the Warblers are for the Redstart. It is quite possible that other species of Warblers were seen but as they were not taken or determined with certainty they are not here noted.

59. *Mniotilta varia*. BLACK AND WHITE WARBLER.—Common.

60. *Vermivora ruficapilla*. NASHVILLE WARBLER.—Abundant.

61. *Vermivora peregrina*. TENNESSEE WARBLER.—Tolerably common.

62. *Compsothlypis americana*. PARULA WARBLER.—Very common.

63. *Dendroica tigrina*. CAPE MAY WARBLER.—Rare, one seen and taken.

64. *Dendroica aestiva*. YELLOW WARBLER.—Very common.

65. *Dendroica caerulescens*. BLACK-THROATED BLUE WARBLER.—Very common.

66. *Dendroica coronata*. MYRTLE WARBLER.—Very common. Abundant in September.

67. *Dendroica magnolia*. MAGNOLIA WARBLER.—Abundant.

68. *Dendroica pensylvanica*. CHESTNUT-SIDED WARBLER.—Very common.

69. *Dendroica castanea*. BAY-BREASTED WARBLER.—Tolerably common.

70. *Dendroica fusca*. BLACKBURNIAN WARBLER.—Very common.

71. *Dendroica virens*. BLACK-THROATED GREEN WARBLER.—Very common.

72. *Seiurus aurocapillus*. OVENBIRD.—A rare species in the North Bay neighborhood. I have seen it there but once or twice though there is much country that seems suitable for it. I regard it as a rare summer resident.

73. *Oporornis philadelphia*. MOURNING WARBLER.—Very common.

74. *Geothlypis trichas*. MARYLAND YELLOW-THROAT.—Very common.

75. *Wilsonia pusilla*. WILSON'S WARBLER.—Tolerably common.

76. *Wilsonia canadensis*. CANADIAN WARBLER.—Very common.

77. *Setophaga ruticilla*. AMERICAN REDSTART.—The Redstart is the commonest Warbler. Its numbers are perhaps double those of any other small bird during its season and its voice is the one most often heard. Long after I had learned unmistakably a score of other Warbler songs the Redstart continued to puzzle me with new attempts and variety. It sings through May, June and July, and it is not until August that it is silent. Even then occasional notes are heard and it is seen flitting about. I found far more Redstarts' nests than those of any other species.

78. *Anthus rubescens*. AMERICAN PIPIT.—One of the most abundant of fall migrants. I have no record of them either in spring or summer, but about the middle of September they begin to arrive in small numbers, increasing daily until by the end of the month they are the most abundant bird present. In flocks of 50 to 100 they swarm the open clearings, feeding on the ground. They are very active and seldom linger long in one spot. Often for no apparent reason the whole flock will rise in a weak vacillating flight and seek another part of the clearing. They perch on stumps, bobbing their tails and the hinder ends of their bodies with a regular teetering motion. The

movement serves no apparent purpose, being merely a nervous habit. It would be interesting to know whence it came and what was its original purpose. Why have the American Pipit the Palm Warbler, the Spotted Sandpiper, and others this tail teetering habit. The Pipit leaves about the middle of October.

79. *Troglodytes aedon*. HOUSE WREN.—This Wren can often be found in the same localities as the Winter Wren, thus belying its name. The facts are that there are far more old Woodpecker holes and hollow stumps in the woods than nooks and crannies about the settlement. It is not unusual here to find the two Wrens nesting but a few yards from each other. On one occasion I put a number of tin cans in suitable places but none were occupied as the birds evidently preferred their natural cavities. The House Wren disappears earlier than the Winter Wren. By the first of October the former is gone whilst the latter remains until later in the month.

80. *Nannus hiemalis*. WINTER WREN.—This mouse-like little bird was commonly seen slinking amongst the underbrush. It is difficult to observe on account of its dull markings and its retiring and active habits. I found that it uttered, when alarmed, a single note not unlike that of the Song Sparrow and it often escaped from one brush pile to another, flying very low and even under the leaves of the low shrubs that crowd the floor of the forest. When undisturbed the Winter Wren indulges in a beautiful liquid song, full of little runs, trills and warbles given in different keys, the whole being continuous and lasting several moments. In fall it is less abundant and quite silent.

81. *Certhia familiaris*. BROWN CREEPER.—Rather rare transient. The Creepers appear in May and occasionally then I have heard them break into a faint wheezy song of five notes not unlike that of the Black-throated Green Warbler, but less musical. Creepers are absent all summer but appear again in September when they are silent but for a long, wiry "scree" a note which seems to keep the flock together.

82. *Sitta canadensis*. RED-BREASTED NUTHATCH.—This is the only Nuthatch for which I have records in the locality. It is a common summer resident, usually confined to the coniferous woods. It may appear in the winter but I have never seen it then.

83. *Penthestes atricapillus*. BLACK-CAPPED CHICKADEE.—The Chickadee appears to be a transient visitant, being common in late spring, absent or not observed in the summer and re-appearing in the fall about the end of September. I have seen them on one or two occasions in winter.

In fall migration when in greatest numbers they are always in company with Kinglets, Brown Creepers and Red-breasted Nuthatches.

84. *Regulus satrapa*. GOLDEN-CROWNED KINGLET.—A common summer resident. There were usually two or three together when met with in the thick woods but as far as I could see they showed no signs of nesting and were never long in one place. They were most abundant from September 10th until October.

85. *Regulus calendula*. RUBY-CROWNED KINGLET.—Found only rarely throughout the summer and then generally but single individuals. About the middle of September they became more common along with the Golden-crown but never in as great numbers. They move freely about in a flock of many mixed Kinglets and I should judge the proportion of numbers to be about five to one. The note of the Golden-crowned Kinglet at this season is the usual quiet "s-s-s" like three s's and rarely anything else. In fall, besides having a loud "cack" not unlike the note of a Wren, the Ruby-crown often breaks forth into a fragment of its spring song. They are evidently migrants through September and October for they are very restless and seldom seen later.

86. *Hylocichla fuscescens*. VEERY.—Tolerably common summer resident. Generally found in the same habitat as the Olive-backed. I have sometimes heard the two singing together in the same woods in the evening. The Veery is the least shy of our common Thrushes and the least suspicious of man. I have never heard it sing in the fall.

[*Hylocichla aliciae*. GRAY-CHEEKED THRUSH.—There is every probability that I have seen the Gray-cheeked Thrush but have not been able to separate it with certainty from the very similar Olive-backed.]

87. *Hylocichla ustulata*. OLIVE-BACKED THRUSH.—A common summer resident. Unlike the Hermit Thrush, it does not diminish in numbers as the season advances. It is by far the commonest Thrush in song, especially in the evening and to be heard even into August. During September it is even more silent than the Hermit Thrush, though I have reason to believe it then just as common.

88. *Hylocichla guttata*. HERMIT THRUSH.—Apparently a transient. Throughout the month of May it is tolerably common, several being seen on almost any extended walk in their haunts. In the evening they are often heard in full song, a much fuller one than we ever hear in Toronto on migration. There it seems to be fragments uttered in a quiet way, but here the Hermit Thrush gives himself up to a full, free, extensive, singing. Through July, August, and the first

part of September it is nearly or quite absent or else very quiet. In late September and October it is in evidence again. Towards evening they call to each other with a soft mellow whistle but there is no true song in the fall.

89 *Planesticus migratorius*. AMERICAN ROBIN.—Tolerably common summer resident. In full song throughout the summer. Late in September Robins gather in the clearings with the Bluebirds.

90. *Sialia sialis* EASTERN BLUEBIRD.—Blue-

birds do not appear in any great numbers in spring or summer but occur in loose flocks of several hundred individuals in September. They are generally silent and spend much of their time passing along in a desultory way, following the line of open stumpy clearings. They perch on the stumps, fly down into the grass for insects and return to their perches to devour the catch. The only note I have heard at this season is the usual plaintive "dee-dee."

SOME INTER-RELATIONSHIPS OF BOTANY AND THE SISTER SCIENCES

Vancouver Natural History Society Presidential Address

BY PROF. JOHN DAVIDSON, F.L.S., F.B.S.E.

AS I look back to our first meeting some four or five years ago, when about 60 ladies and gentlemen gathered in this room to establish a Natural History Society, and when I think of the size of our present membership, and the enthusiasm displayed by the attendance of large numbers of active members at our summer excursions and annual camp, it tends to emphasize the responsibility and the honor of the position to which you have elected me. I trust that the enthusiasm and fine spirit of fellowship and co-operation which characterized our summer work will be maintained and augmented during the winter, so that we may enlarge the scope, and increase the usefulness of the Society as a factor in the uplift and enlightenment of those with whom we come in contact; for it cannot be denied that the study of any phase of God's work must have an elevating influence on the minds of those who participate in it.

The subject of my address, "Some Interrelationships of Botany and the Sister Sciences," might have proved more attractive to some of our members had I omitted the word BOTANY from the title, but as I never call a spade a spoon I refrained from using the higher sounding term PHYTOLOGY, knowing that many of our members would not recognize this modern synonym for Botany.

I do regret, however, that, to some people, the word BOTANY should act like a red rag to a bull. The mere mention of the subject almost infuriates them; it arouses recollections of hard and uninteresting work, of long strings of unintelligible terms; they detest it; they hate it. I know this to be true; high school students have told me, and teachers have admitted it.

I have no fault to find with those people; I am sorry for them, they have my sincere sympathy; they have been misinformed and misled by out-of-

date instructors, and it arouses intense indignation within me to think that so many people have been deprived of much real pleasure and enjoyment through the fact that, during their school days, they were unfortunate in being placed under unqualified or incompetent teachers.

The Botany of to-day is no longer the Botany of the 16th or 17th century; though some teachers continue to give the old, obsolete Botany, and do not know it; yet they wonder why their pupils make such a poor showing at the examinations. Those teachers probably do not realize that the subject is evolving, that new discoveries shed more light than was available in the dark ages, revealing new problems and sending old ideas into the shadows of oblivion.

DEPENDENCE OF ANIMALS ON PLANTS

The botanist of today is essentially a biologist. He is studying life, and all the factors which in any way influence or affect the life of the plant. He recognizes the absolute dependence of the Animal Kingdom on food manufactured by plants. It is therefore of considerable importance to us that we should know something of the vital processes which enable us to maintain and enjoy our lives. On the success or failure of the vegetable kingdom depends the success or failure of the animal kingdom. The distribution of big game in Canada is closely related to the distribution of the plants on which the animals feed, and so with the distribution of birds and insects. To illustrate this: During the gale of 1894 many thousands of trees in the forests in the North of Scotland were blown down; so many that it took several years to clean up the forests again. This devastation was followed by the visits of several birds which previously had not been recorded for that region, and as these new comers were insectivorous birds it was observed that they were feeding on the

larvæ of beetles and other insects which attacked the dead timber. Ordinarily the forests of Scotland are kept so free of decaying logs that there is little material for such insect pests, and therefore no food for the birds which visited the scene on that occasion. Similarly in British Columbia the destruction of our forests by logging and fires must be accompanied by a change in the flora and finally a change of fauna.

In his study of factors influencing the life of plants, the modern botanist finds that his work leads him into some branches of the sister sciences: Zoology, Geology, and even Astronomy and Meteorology.

ASTRONOMICAL AND METEOROLOGICAL INTER-RELATIONSHIPS

He can show that there is a relationship between sun-spots and the high cost of living. This can be verified by consulting the records of sun-spots and temperatures for a given number of years and comparing these with the price of wheat during those years. Astronomers and meteorologists have observed that the occurrence of sun-spots is succeeded by a spell of cold weather, this adversely affects the growth of wheat and other food plants, resulting in an appreciable diminution of the crop, and a consequent increase in cost of the world's food supplies.

ZOOLOGICAL INTER-RELATIONSHIPS

To show how plants and animals are similarly bound together by a web of complex relations, one need only mention Darwin's classic explanation as to how the Clover crop may depend on the number of cats in a district. Many of you are familiar with the details, and I will only summarize them for the benefit of those who may not have read Darwin's "*Origin of Species*". It is well known that Clover is largely dependent on Humble bees for pollination. Darwin states that seventy heads of Dutch Clover yielded 2290 seeds, and twenty heads protected from bees produced not one. One hundred heads of Red Clover produced 2700 seeds, and the same number of protected heads produced not one single seed. The number of Humble bees depends in great measure upon the number of field mice, which destroy their combs and nests; the number of mice depends on the number of cats. Col. Newman is quoted as saying that "Near villages and small towns I have found the nests of humble bees more numerous than elsewhere, which I attribute to the number of cats that destroy mice."

We could go further, and show that a failure of the Clover crop might result in a scarcity of fodder and of nectar thus preventing our fair Province from becoming a land flowing with milk and honey.

CO-OPERATION OF ANIMALS

The inter-relationships of Botany and Zoology are so numerous that in studying the life of plants it is also necessary to study the habits and life of some animals. I have already referred to pollination in the case of Clover, and if one had time to discuss the pollination of some of our native flowers you would find it a fascinating branch of the subject. The ingenious devices or adaptations of flowers to secure the visits of suitable insects; and the contrivances for the exclusion of unsuitable visitors; how flowers open, and shed perfume only when suitable insects are on the wing; how others hold the insect prisoner until the flower is ready to liberate it, to be again imprisoned by another flower; how others set water traps, or exude sticky fluid to prevent unsuitable insects from robbing the nectar in the flowers; these are mere incidents in the life of the plant, yet they cause us to enquire into the orders of insects which are suitable or unsuitable in effecting the pollination of different flowers.

To illustrate how complete is the relationship between insects and the structure of flowers, I may mention that in studying the flora of Madagascar, botanists discovered many flowers not found in any other part of the world. Amongst these was an orchid *Macroplectron sesquipedale*, which secreted nectar at the end of a tubular spur 10 to 18 inches in length. Naturalists doubted the existence of any insect with a proboscis long enough to reach the nectar, and certainly at that time no such insect was known. Darwin, however, prophesied that a butterfly would be found in the same locality with a proboscis long enough to drain the tube; and several years later a naturalist named Forbes, working in the same region, confirmed the prediction by discovering the insect.

In studying the distribution of plants throughout the world, we have to consider the method of seed dispersal, and many plants use animals as distributing agents. Botanists in all parts of the world are endeavouring to ascertain the origin of many genera and species of plants, and we have to take into account the migration of birds and other animals to ascertain if some of our British Columbia species came from the north or from the south. Take for example a problem which has interested me for many years, namely, the origin of Dogwood, Arbutus, and Cascara. These trees range from California to British Columbia, they all reach their northern limit in this Province, and they are generally referred to as southern plants, but it is just possible that they may belong to British Columbia and have spread south. These trees have edible fruits and the seeds are distri-

buted by birds. Many birds come here in spring and return south in the fall when the fruits are ripe. There seems little likelihood of the seeds having been brought from the south, as the birds leave the southern climes before the trees have come into flower. We have therefore to know which birds eat the fruits of those trees and to ascertain if such birds are migratory.

This is a comparatively new branch of our work, and its importance is rapidly gaining ground. It means an examination of the crops of birds at different seasons, and is of value to ornithologists interested in the feeding habits of birds. As an aid to this work we have in the University a collection of seeds of nearly 1000 native plants. We have most of the common species and many of the rarer ones.

While speaking of the inter-relationships of birds and plants I should emphasize the fact that when birds feed on berries and act as agents in the dispersal of seeds they are not to be regarded as parasitic. When a plant or an animal obtains its food from another living plant or animal to the detriment of the host, it is a parasite; therefore when birds eat the cherries or the strawberries in your garden they are rendering a service instead of doing an injury to those plants.

STRUGGLE BETWEEN PLANTS AND ANIMALS

It is different in the spring, however, when you have sown sweet peas, and just as you see the rows of little shoots appearing through the surface of the ground, pheasants or other birds come along and cause the seeds to come up faster than nature intended they should. Birds may then be regarded as biological parasites because their feeding is detrimental to the host. Farmers and gardeners frequently apply other terms to those birds; but, from the omission of such terms from our dictionaries, we may assume that they are superfluous.

The relationship of Botany to Entomology is perhaps closer than that of any other branch of Zoology; no one can become an efficient botanist without some knowledge of Entomology; neither can one become an efficient entomologist without some knowledge of Botany.

Two or three years ago I showed you how man's interference with natural conditions around Vancouver caused a change in the flora, with a consequent change in the fauna, including the plague of tent-caterpillars. Entomologists, working on this problem from a purely entomological point of view, had only one remedy—spraying—which was no remedy. The plague increased the following year because the food plants were protected for the next generation of caterpillars. It was not until the problem was tackled from the com-

bined entomological and botanical points of view that an effective remedy was inaugurated; and the destruction of food plants on vacant lots and waste ground soon made an impression on the plague and reduced the menace to our garden crops.

PLANT DISEASES CAUSED BY ANIMALS

Most of you are aware that the tent-caterpillar is the larva of a moth, and I think all of you are familiar with the devastation brought about by its ravages; but we may be thankful that, so far, we have escaped a plague of saw-flies. During a short holiday in the State of Washington this fall, I saw many Alder trees absolutely stripped of every leaf, with myriads of small, green, smooth-skinned caterpillars all over the trunks and branches; the ground under the trees was strewn with hundreds of thousands of the wriggling creatures with the characteristic coiled posterior end. In one locality, about half way between Seattle and Tacoma, we stopped for lunch at an auto-campers' picnic ground. There were several large tables set out for the use of campers in what was once a beautiful grove of large Alder trees; at the time of our visit they were practically leafless. You have probably heard the expression "Raining cats and dogs"; it was literally raining caterpillars. You could scarcely find room on the tables to set a cup down; in some places the caterpillars lay in small heaps; if you wiped off a table with a newspaper you had to do it carefully because the caterpillars were so easily squashed; and in the pitter patter of falling caterpillars you were fortunate if one did not fall on your sandwich or in your tea. If this pest ever reaches our locality where we have so many hundreds of thousands of Alder trees we will have a plague many times more disgusting than the one through which we have passed.

It is true that for purely local application spraying may be effective in protecting individual trees from the ravages of such pests, but it is useless in combatting a plague.

There are many diseases of plants caused by insects and other animals which can not be reached by sprays. I refer to those parasitic animals which cause malformations, tumours or galls on roots, stems or leaves of plants. The study of plant-galls and their makers necessitates an intimate knowledge of plant physiology and histology, combined with a knowledge of the life history and habits of certain groups of animals, particularly mites, and some orders of insects. Nematodes frequently cause galls on roots, but as these are underground they are rarely seen. Any one, however, with open eyes will find a great variety of plant galls in this vicinity.

The Spruce gall is perhaps the best known, though novices often mistake it for a cone. The maker of this gall spends one half of its life history on Spruce, and the other half on Douglas Fir, and in its two stages may be mistaken for two different animals.

The large knotty growths on branches of the Thimble berry are caused by another type of gall maker related to the Saw-flies and Ichneumon flies, known as gall flies (*Cynipidae*). Then on leaves we find the Spangle galls, Currant galls, and Apple galls formed by *Cecidomyia* and other allied insects. Perhaps the most beautiful result of such infections is to be seen on leaves of the Mountain Maple, where the upper surface is beautifully marked or streaked with carmine, red, or crimson. I have seen such diseased trees transplanted to a garden because the leaves were more beautiful than the leaves of the healthy trees, and I once received specimens of diseased shoots of this Maple from a correspondent who thought he had found a new variety.

This reminds me of a somewhat amusing experience I had about ten years ago. An enthusiastic amateur botanist called at my office with specimens of one of our native roses (*Rosa gymnocarpa*), the Naked-fruited Rose, which, instead of the small globular fruits, had enlarged pear-shaped fruits. My friend was convinced he had discovered a new variety and desired my opinion before he published a description of it under the varietal name *pyriforme*. At his request I visited Kitsilano, where these roses grew, and, although most of the rose-fruits were pear-shaped, I found some bushes bearing both globular and pear-shaped fruits. This aroused some doubt in my mind as to the validity of the proposed variety *pyriforme*. I made a collection of seed for the botanical garden, to see if the offspring would bear similar fruits. I also retained a supply of seeds for the seed-collection in my office.

The following year the gardener informed me that not one single seed of this rose had germinated; he asked if I could let him have some more. On inspecting the supply in my seed collection I discovered that every seed had a little hole in it, and along with the seeds I found a large number of small gall-flies. The pear-shaped fruits were diseased ones, they had all been galled by these tiny flies, whose appearance confirmed my reason for doubting the validity of variety *pyriforme*. I may say that last month (September, 1922), during a botanical visit to the West Coast of Vancouver Island, I found the same rose with pear shaped and globular fruits on the same plant. I smiled, and said to my colleague, Professor

Hutchinson, who was with me, "Variety *pyriforme*." Like Darwin I can prophesy that some day a gall fly similar to one found at Kitsilano will be discovered near the Great Central Lake on Vancouver Island.

TABLES ARE TURNED—PLANTS ATTACK ANIMALS ANIMAL DISEASES CAUSED BY PLANTS.

In the time at my disposal I cannot do more than merely mention some instances of parasitism where plants are the offenders and animals the hosts; even man is not immune to attack by plant parasites. Dandruff on the scalp is a fungus similar to mildew, the so-called Ringworm is not a worm but a fungus, like a mould, living on the skin. Another mould is sometimes found in the stomach of man, more frequently of horses, causing the disease known as Aspergillosis (named after the fungus). The so-called vegetable-caterpillar is merely a caterpillar skin filled up with woody substance formed by a fungus which attacked the living caterpillar, killed it, and used up all the internal organs. Salmon disease which attacks young fish and injured salmon is a skin disease caused by another parasitic plant, and all our bacterial diseases belong to the Schizomycetes or splitting fungi—belonging to the vegetable kingdom. Then we have the carnivorous plants which capture and digest small animals. The ingenuity, approaching sagacity, exhibited by the many kinds of insect-eating plants, and by some which entrap small crustaceans and other water animals, is so extraordinary in its diabolical efficiency that to study them from an insect's point of view is to invite hideous nightmares of tortures unsurpassed by those which martyrs suffered in the dark ages.

Imagine walking along the street, when a door suddenly opens and you are drawn by an unseen hand into a dimly lighted room containing scores of bodies in all stages of decomposition. From the walls of the room shoots a fine spray of fluid which dissolves your skin and flesh; you are being digested alive. This has been the experience of millions of creatures which came into close proximity to the bladder-like traps of the Bladderwort which is to be found in Trout Lake, Vancouver, and many other lakes in British Columbia.

The beautiful Sundew, which most of you have seen on our Burnaby Lake Excursions, appears to an insect as a deadly monster, like a giant devil-fish with many fiery tentacles ready to seize and devour the first creature to come into contact with it. The baited traps of different Pitcher plants which lure their prey by intoxicating drinks, then drown the unfortunate victims in a digestive fluid; and the miniature bear-traps of the Venus Fly-trap and Aldrovandia, the latter an aquatic plant like Bladderwort, all have their romantic story to

tell, but I have not time at present to do more than mention them.

GEOLOGICAL INTER-RELATIONSHIPS

I mentioned Burnaby Lake excursion a moment ago. Those of you who were present at that outing may remember how intimately the flora of the district is connected with its Geology. Prof. Rigg of the Department of Botany, University of Washington, has for a number of years been studying the composition of bogs in the United States and Alaska. He collects samples of peat or muck from various depths and sends them to a geological friend in California to have his report on the plants which formed the bog. This summer he visited Vancouver and I had pleasure in showing him over the bog at Burnaby, from which he secured a number of samples. He declared it one of the most interesting bogs he had seen, and was delighted to see such a beautiful illustration of plant successions as we see along the path of the edge of the lake.

With special apparatus which he brought up with him, we sounded the bog at various points and found that the vegetation extended to a depth of about 21 feet; between 21 and 22 feet we found blue clay. At the time of our visit there was only about an inch of water at the end of the floating path near the lake margin, but our soundings showed that under this was 14 feet of liquid mud, and it was not till we reached a depth of 16 feet that we could get mud firm enough to obtain a sample.

From a study of the flora we know that near Burnaby Lake is one of the oldest bogs in our locality, and similarly we know that the bog on Lulu Island is comparatively recent. From a study of the geology of those districts the geologist arrives at the same conclusion. The inter-relationship of Botany and Geology is so important that one of our members, Prof. M. Y. Williams, has charge of the branch of Geology known as Palaeontology, which is devoted to the study of the prehistoric plants and animals as recorded in fossils from all parts of the world.

We are indebted to geologists for our knowledge that in the past ages many plants and animals existed which are now extinct, and from the enormous amount of material collected by these scientists we have a very large and important branch of Botany—Palaeontological Botany—which

deals only with the examination and classification of the fossil remains of the early forms of vegetation; and the work of palaeontological botanists has had a very important bearing on our present system of classifying our modern plants. I may say that the main groups of our natural system of classification are based on what we believe to be the approximate order of creation. The Creator has written the record of his work on tables of stone, and it is for us to exercise our God-given intellect in an endeavour to read and interpret correctly the story of creation which He is gradually revealing. Truly we can find "Sermons in stones, books in the running brooks, and good in everything."

ANTHROPOLOGICAL INTER-RELATIONSHIPS

Before concluding I should like to draw attention to the importance of Botany in studying the Natural History of Man. Ever since his first appearance in history, man has been dependent on plants for his existence and all his comforts. In the garden of Eden, apple trees and fig trees furnished his food and clothing, and though in modern times our needs in this direction are not so easily satisfied, we are just as dependent on plants as Adam is reputed to have been.

The study of the uses of plants by primitive races and native tribes has given rise to a comparatively new branch of Botany known as Ethnobotany, which deals with the plants used for food or medicine, fibres, dyes, woods, etc., used in the making of apparel or implements of various kinds.

From the crude beginnings of our ancestors came our modern Economic Botany which deals with our botanical resources in furnishing the many requirements for textile and other industries. We are liable to forget our dependence on plants for rubber tires and electrical insulation; gums, resins, oils, and alcohol for the manufacture of paints and varnishes; dyes and disinfectants, fabrics and hides; for without the green blade we should have neither wool, nor silk, nor footwear.

If my address has proved dry and uninteresting because the main part of my subject is Botany, it is my fault. I find it a fascinating subject after one has learned the botanical alphabet, and I enjoy every opportunity I get of helping others to share the fascination I find in its study. If I have failed on this occasion, I promise I will never address you on Botany again. Next time, if there is a next time, I shall call it Phytology.



FURTHER NOTES ON THE ORCHIDS OF HATLEY, STANSTEAD COUNTY, QUEBEC, 1921-1922

BY HENRY MOUSLEY

IN MY last paper on the Orchids of this district, "*The Canadian Field-Naturalist*," Vol. XXXIV, 1920, No. 9, pp. 169-173, I pointed out that so far as I knew, Hatley tied with Fairlee in Vermont for first honours, as regards the greatest number of species to be found in a given area, which at that date stood at thirty-three for both places. Since then my most optimistic hopes have been more than realized for out of the eight remaining possibilities, as mentioned on page 172, no less than three have been found during the present season, 1922. These consist of the Small Wood Orchis, (*Habenaria clavellata*), the Ragged Fringed Orchis (*Habenaria lacera*), and Menzies' or the Northern Rattlesnake Plantain (*Epipactis decipiens*), all of which will be dealt with hereafter in an annotated list as before. The finding of these three new species now places Hatley at the very top of the list, in fact, it is doubtful if any other place in Eastern North America can produce such a record as thirty-six species for so small an area. Very little work was done with the orchids during the season of 1921; indeed, I was absent from Hatley for part of July and the whole of August, and never once visited the famous swamp near Beebe, nor had I an opportunity of verifying the four supposed plants of *Epipactis decipiens* found on September 3, 1920, and recorded in "*The Canadian Field-Naturalist*," Vol. XXXIV, 1920, No. 9, p. 170. The only event of any real interest was the finding, on June 30, of several nice plants of *Habenaria orbiculata* and *H. macrophylla* in full bloom. It was not until the following spring (1922), that I decided to give the orchids especial attention again as in 1920, in an endeavour to break all existing records, and at the same time to satisfy myself of the further possibilities, or otherwise, of the great swamp near Beebe. With this object in view, I repaired there on May 24, hoping to find *Calypso*, which was already in bloom at Hatley. In this I was disappointed, for no trace of the lovely little orchid could be found, at least, not in that part of the swamp I was able to work. My next visit there was on July 1, principally with the object of seeing *Orchis rotundifolia* once more. On arrival I made immediately for the spot where Mr. Ludlow Griscom and I found it in 1920. Four plants only were in bloom, and it was whilst locating these, that I was also fortunate in discovering four plants of *Habenaria clavellata*, as these were in bud only. Later on I found a plant of *Micro-*

stylis unifolia, both these latter being new to the swamp list which already stood at eleven species as previously recorded in 1920. *Arethusa* was decidedly on the wane, but *Calopogon* and *Pogonia* were in fine condition, and more generally distributed than I had previously been able to ascertain. One interesting plant of *Calopogon* had the tips of the three blooms snow white, whilst the petals and sepals were of a much paler shade of magenta-crimson than usual. I allowed a month to elapse before paying my next visit on July 29th, when I found *Habenaria clavellata* fully out, and one fine plant of *Habenaria lacera* partly in fruit. The Northern White Orchis (*Habenaria dilatata*) was in great profusion, but the var. *media* could not be found, although many times I thought I had it, when coming on fresh examples of *H. hyperborea* which were growing with *dilatata*. Fine specimens of the Hooded Ladies' Tresses (*Spiranthes Romanzoffiana*) were also met with. This orchid has an interesting history behind it, having been discovered in Ireland on August 3, 1809 or 1810, by Mr. J. Drummond, this being the only European station known for the species. How it got there, did it ever occupy other European territory, or was it a migrant from America or vice versa, or was it common to both Continents are interesting problems. At all events it is probably extinct in Ireland by now, as in 1886 two of the very few stations where it used to be found were ploughed up, and the one planted with potatoes, and the other with oats. Thus perish some of our treasures, not always by the hand of the unscrupulous collector! This species, with the other two named, was new to the swamp list, and brought the total up to sixteen species. It hardly seemed likely that anything further could be added, but I paid the place another visit on August 12th, when *Epipactis repens* var. *ophioides* and *Corallorhiza maculata* (in fruit) were met with, thus bringing the list of orchids found in this swamp up to a total of eighteen species. Never having made a list of those to be found in the large swamp to the northeast of Hatley village already referred to, "*Ottawa Naturalist*," Vol. XXXII, 1919, No. 8, p. 144, I decided to do so, and found the following thirteen species there, viz: *Cypripedium hirsutum*, *C. parviflorum*, *Habenaria hyperborea*, *H. obtusata*, *H. orbiculata*, *H. dilatata*, *H. bracteata*, *Calopogon pulchellus*, *Arethusa*

bulbosa, *Listera convallarioides*, *L. cordata*, *Corollorhiza trifida*, and *Liparis Loeselii*.

Most of the other known localities in the immediate neighborhood of Hatley were visited, but without any great results, until August 5, when the four supposed plants of Menzies' or the Northern Rattlesnake Plantain (*Epipactis decipiens*), before mentioned, were found to be this species, a fuller account of which, however, appears in the following annotated list of the three new species discovered this season.

SMALL WOOD ORCHIS. *Habenaria clavellata* (Michx.) Spreng.

This species was first discovered on July 1, 1922, in the large swamp near Beebe. At this date only four examples were noted, and these were not fully grown and were in bud only. Visiting the swamp again on July 29th, I discovered a much larger colony, some distance away from the other one, and now the plants were in full bloom, and it was interesting to note that many of them had emarginate spurs, the same as found by Mr. Edward A. Eames near Damariscotta, Maine, early in August, 1920, a description and plate of which will be found in "*Rhodora*," Vol. XXIII, 1921, No. 270, pp. 126-127.

RAGGED FRINGED ORCHIS, *Habenaria lacera* (Michx.) R. Br.

This interesting species, with its deeply incised lip, was also met with in the above swamp on July 29th. Unfortunately, it was not discovered until just as I was leaving for home, and only one plant could be located, so that at present I am unable to give any idea of its abundance or otherwise. The plant in question was a fine one, but at this date only the upper part of the raceme was in flower, the lower portion being in fruit. Incidentally, I might mention that the exact height of this swamp above sea level is 850 feet, and not about 700 feet, as previously conjectured.

MENZIES' or THE NORTHERN RATTLESNAKE PLANTAIN, *Epipactis decipiens*, (Hook.) Ames.

This, the largest of the Rattlesnake Plantains was first definitely identified on August 5, 1922, although on September 3, 1920, I had found four plants in fruit, which I took to belong to this species, as previously recorded. The site was in a somewhat large wood, which, however, I had not visited for some years (although it was within a mile of my house), at least, not at this particular time of the year. There I found quite a number of plants, and, later on, a few more in an adjacent wood. After this discovery, I decided to visit another wood some miles away, where I usually take *E. repens* var. *ophioides* and *E. tessellata*. This wood is a somewhat damp one, mostly covered with sphagnum moss, in striking contrast

to the ones containing *E. decipiens*, which were dry, the plants being found mostly on hummocks under hemlocks. At first I could find nothing but *tessellata* (this was on August 9) which at that date were nearly all in fruit, but, moving away to a drier part of the wood, which I had not previously examined, I came upon a small colony of *repens* and *decipiens*, the former in fine condition, and the latter with at least the upper half of the spikes in bloom. I was thus enabled to compare all three species on the ground, and note the general difference in the size and shape of the racemes, flowers and leaves of *decipiens*, as compared with those of *repens* and *tessellata*, irrespective of the technical difference in the lips, etc.

The first record for this orchid in the State of Vermont was obtained by Miss Inez Addie Howe, who gives a pleasing account of her find of two plants in August, 1917, together with a beautiful illustration of one of them from a photograph by the late Wm. Everard Balch; see "*The Vermonter*," Vol. XXV, 1920, No. 7, p. 87 and 107.

It will be noticed that I have adhered to *Epipactis* and *Microstylis* as the generic names for the Rattlesnake Plantain and Adder's Mouth families respectively. This has been done in order to keep in line with my previous papers, which were based on the nomenclature of Gray's *Manual of Botany*, seventh edition. At the present time it would doubtless be more up to date to revert to *Goodyera* for the former, and use *Malaxis* for the latter. With these changes, and the revision of *Pogonia* by Prof. Oakes Ames, "*Orchidaceæ*," Ames, Fascicle VII, 1922, pp. 3-38, nomenclatural matters will probably be settled for some time to come. To those interested in luxury-symbiosis or the dependence of orchids on a mycorrhizal fungus for their propagation, I would recommend the following most interesting papers by Prof. Oakes Ames, viz.: "Seed Dispersal in Relation to Colony Formation in *Goodyera Pubescens*," "*The Orchid Review*" Vol. XXIX, 1921, pp. 105-7, and "Observations on the Capacity of Orchids to Survive in the Struggle for Existence," "*The Orchid Review*" August, 1922, pp. 1-6.

In conclusion I may say that it is my intention to present pressed examples of all the orchids enumerated in my papers to the National Herbarium of Canada, Victoria Memorial Museum, Ottawa. This was partly accomplished in February, 1921.

A BIOLOGICAL RECONNAISSANCE OF PORTIONS OF NIPISSING AND TIMISKAMING DISTRICTS, NORTHERN ONTARIO

BY J. DEWEY SOPER

SINCE my study of the bird and mammal life in the Ridout region, District of Sudbury, some years ago, it seemed fitting to make a trip into the wilds of Temagami as a sort of a continuation of that study. The two regions, not far separated geographically, are essentially the same in character, being extremely rugged and principally in the Canadian Zone. With one or two exceptions, I could hardly hope to swell the list of species obtained in the Ridout country, but there was a possibility of discovering something new in respect to the distribution of some of the forms. As an added inducement, too, I understood that no faunal naturalist had previously visited this region. Also, *Zapus* had hibernated by the time I reached the Ridout country in 1918, and in planning the Temagami trip I was particularly anxious to visit the country at such a time, if possible, as to insure filling the *Zapus* gap in my list. In this I was successful, as the following list discloses, obtaining not only the common jumping mouse, but the much rarer one, *Zapus insignis*—the will-o'-the-wisp of many a collector.

The region here referred to lies about one hundred miles north of North Bay, embracing the Temagami Forest Reserve, the valley of the Montreal River, and the Ontario side of Lake Timiskaming. The Temagami country is especially typical of the Canadian zone, being forested throughout with such characteristic conifers as white, red and banksian pine; white and black spruce; hemlock and balsam fir; Aspen, larch, balsam poplar, yellow and canoe birch completed the forest. On the lower Montreal River from Latchford to Lake Timiskaming we encountered an intrusion of the Transition Zone where additional species were met with, such as black ash, red oak, mountain and sugar maple, white elm and white cedar.

The geological formation is pre-Cambrian, consisting of Lower Huronian and silver-bearing Keewatin, with isolated igneous masses of diabase and anorthosite. The country for the most part is extremely rocky, with a fairly good forest covering and profusely sprinkled with deep, clear lakes of all sizes.

Accompanied by Mr. Herbert Allan, of Toronto, I commenced the canoe journey at Temagami Station on the morning of August 29, 1920. The route lay by way of the main Temagami Lake, Wakimika, Ababika, Diamond, and Lady Evelyn

Lakes, thence to Sucker Gut Lake, back to Lady Evelyn and down the Evelyn and Montreal rivers to Lake Timiskaming where our trip came to a close at Haileybury about the middle of September.

One of the most interesting features of the trip was the consciousness of passing from one zone to another while descending the Montreal. The demarkation was by no means abrupt or even pronounced, but of sufficient distinction to attract attention. Later, the antithesis became more marked. Early in our descent of the river I was conscious of an increase in birds, not only in relative numbers but in species as well. The Transition element becomes particularly conspicuous below Latchford. On the morning of our leaving the latter place we heard the first Red-eyed Vireo of the trip, and his talkative outbursts met our ears frequently from then on. Song Sparrows and Robins, both of which were very scarce in the Reserve, now became more conspicuously common. Large flocks of the latter were met with in the vicinity of Poigan Rapids and below, where such hardwoods as red, sugar and mountain maple, black ash, white elm and red oak were first seen or became decidedly more numerous. Two of these species at least find their northern limit in this vicinity—the sugar maple and the red oak. Some of these, notably the black ash, are not confined to this particular portion of the valley, but the hardwoods as a whole and especially the white elm are decidedly more common at this point. Canoeing down stream one detects the change almost at once. And with them, becoming comparatively common, are certain species of birds which in the areas of pure stands of conifers were nearly, if not entirely absent. Ruffed Grouse, Flicker, Crow and Grackle are examples which I readily call to mind, while such species as Sparrow Hawk, Red-eyed Vireo, Whip-poor-will and Red-winged Blackbird were now seen for the first time. The appearance of many of these was, perhaps, merely fortuitous as regards a choice of locality, but to any one more or less versed in ornithology the general enrichment of bird-life was readily apparent.

In the Temagami Reserve none but the "little" or Lake Superior chipmunk was observed, and that only once or twice, while on the Montreal it became quite common. The larger and more familiar chipmunk (*Tamias*) put in its first

appearance below Latchford, persisting in considerable numbers down stream at least as far as our last river camp below Poigan Rapids. I realize that none of this evidence is strictly conclusive as regards the segregation of the two zones under discussion, but it does point to a very real, though subtle infusion of the Transition. An observer with more time at his command than I had on this trip, should certainly discover further and more minute distinctions between these two interesting and adjoining regions.

THE MAMMALS

Martes pennanti (Erxleben). FISHER.—The only clue I have of the occurrence of this species is that of a well-marked trail which I saw at

Ababika Lake on Sept. 2. The foot impressions were very distinct in the wet sand of the beach and therefore easily deciphered.

Mustela vison Schreber. MINK.—Presence of the mink was noted at all points enumerated below for muskrat. Their trails were particularly common on the mud beaches above Sucker Gut Falls, and along the river which flows into the lake of the same name from a north-westerly direction. The muddy bottom, in parts, of Sucker Gut Lake is a most prolific breeding ground of the freshwater clam, and all along the shores at intervals we noticed various-sized piles of their empty shells which signified the presence of mink and rat.

(To be concluded in the January issue)

NOTES AND OBSERVATIONS

NOTES ON A SASKATCHEWAN MUSKRAT COLONY.

—In August last, two parent muskrats and their four half-grown young went overland into a sedgy pond of about an acre in extent and two feet in depth in the centre. After two days a burrow was obtained in the state of commencement. A trench was dug from the deepest part of the pond straight toward the shore with a very slight incline. The width of the trench was fourteen inches and the earth piled at the end of the trench. All weeds were removed from the deepest part of the water for a radius of thirty feet. The trench gradually deepened until at the water line of the pond it was twenty-eight inches in depth and fourteen inches in width.

In September the main trench was driven a distance of one hundred and seven feet. At the extreme end a large nest the size of a bushel measure was made three feet under the ground under the roots of a willow. This nest was made of soft dry grass and was completed before the first of October. The burrow was raised three inches above water level at the entrance, and the entrance was thirty feet inland from the water line of the pond shore. That is, there was an open drain from the pond edge to the place where the ground closed over the burrow. Where the burrow proper started under the hill the water measured eighteen inches in depth.

The three-inch air space at the entrance of the burrow gradually increased until there was no water in the burrow at a distance of forty feet from the entrance. The burrow at the highest water mark was fourteen inches high and nine inches wide. The extra height is used in the spring when the ponds are flooded. The colony can use the burrow without being pressed for air even in case of abnormal floods.

From the first to the twentieth of October four tunnels eight inches in depth were driven above

the high water level parallel with the main tunnel and branching from it. Digging into these four tunnels showed that they averaged a length of twelve feet or forty-eight feet in all. These tunnels were packed with tender bulrush roots, sedges, mints, young grass and reeds. The bulk of the store was white and crisp, and very tightly packed. Each of these tunnels was plugged with clay at the junction with the main tunnel to exclude air. Wherever the tunnel tapped a cattle track or other hole the same was tightly plugged and the tunnel continued. The young muskrats aided the parents by carrying earth from the tunnel and also in bringing in the food store. These six small animals must have carried several hundred pounds of earth and food in the last two months. As the pond is very shallow and will freeze to the bottom before Christmas I am going to find out what these creatures will do when the supply fails.—THOMAS D. CARTER.

PRAIRIE WARBLER, *Dendroica discolor*.—It would appear from the literature on the Prairie Warbler that this bird is a casual visitor in Ontario. My first record was made during a visit to the southern portion of Georgian Bay, known as Nattawasaga Bay. While walking along the shore (August 1, 1914) I saw four Warblers high up in a pine and on examining them through my glasses I found them to be the Prairie. On revisiting this spot in 1921, from June until September, I had occasion to study these birds. They were localized and followed the shore line for about fifteen miles, never further than two hundred yards inland. This locality was composed of a few scattered oak, white and norway pines, numerous ground juniper, a typical jack pine ridge. In June the male could be heard singing his characteristic song. These Warblers next to the Myrtle, are the commonest in this

district and I have never, but once, found them elsewhere, and then in Toronto, on April 17th, 1916, a male was observed. The bird generally chooses a dead branch on a fairly tall pine tree from which to deliver his song, and I found them generally to sing while feeding. They have two songs; the first and most common consists of six or seven *Zee's* on an ascending scale, it being often very difficult to locate the singer. The other song, which I have only heard a few times and then always in the evening, is shorter, similar, but not so loud.

On June 19th, 1922, Mr. F. A. E. Starr, who was spending a few days with me, and myself started to find a nest and before our search ended, succeeded in finding four. All were placed in ground juniper, about one foot off the ground, half way up the stem, on the outer branch of the juniper, never in the middle. The nests were neat, cup-shaped structures composed of plant fibre, grasses, pine needles and white bark off birch trees, lined with down a and few hairs. One nest contained two young ready to leave the nest and one young Cowbird, which were destroyed by a red squirrel before I could obtain a photograph. Evidently this bird commences breeding around May 24th. As I have never found a complete nest of eggs I hope to do so in the coming season.

An adult male was taken in breeding plumage and is now in the Collection of Mr. J. H. Fleming.—PAUL HARRINGTON D. D. S.

BEES COLLECTING HEMP POLLEN.—During the past summer, hive bees were frequently observed gathering pollen from plants of Hemp (*Cannabis sativa*) growing at the Central Experimental Farm, Ottawa. That this pollen must have a great attraction for them is evidenced by the fact that on one large plant as many as twelve bees were seen at the same time busily employed.

In Hemp the staminate and pistillate flowers are on separate plants, the pollen is powdery, and the plants are normally pollinated by wind. As the bees did not visit the pistillate plants they performed no useful service in return for the pollen provided by the staminate plants. They were there simply in the capacity of robbers.—J. ADAMS.

BIRDS THAT ARE LITTLE KNOWN IN MANITOBA.—Might I add a few little notes on my friend, Mr. Norman Criddle's, observations under the above caption. At the extreme south end of Range 12, west of the principal meridian, I saw one Burrowing Owl on May 6, 1913. The Arkansas Kingbird was first seen by me between Crystal City and Pilot Mound on May 21, 1909. Hamilton M.

Laing, formerly of Oak Lake, Manitoba, reports in the *Winnipeg Free Press* in a recent article this year that he observed the bird first in 1907 at Oak Lake, Manitoba. In my 15 years' residence in Pilot Mound, commencing in 1901, I saw the Lark Bunting on June 27, 1910, and June 15, 1911, as first appearances for those years when the bird was seen in fair numbers. I saw no nests.—H. M. SPEECHLY.

NEW MAMMAL RECORDS FOR ALBERTA.—During June, 1922, I collected a specimen of the Richardson's shrew (*Sorex richardsoni*) on the Battle River, Alberta, a short distance south of Camrose. So far as known, this is the most southern record for this species in Alberta.

In late August, 1922, while on a trip with Mr. J. A. Munro and Mr. F. L. Farley to Battle Lake, Alta., I trapped a single specimen of the northern lemming vole, *Synaptomys borealis*, in a sphagnum swamp near the north-west end of the lake. This also, so far as known at present, constitutes the most southern record in the province. I submitted this specimen to Washington to have it compared with typical *borealis* collected by Preble in the far north. I thought perhaps specimens from a locality as far west as Battle Lake would begin to show characters of the sub-species *dalli*, but it is pronounced typical *borealis*.—J. DEWEY SOPER.

PINE WARBLER TAKEN IN NOVA SCOTIA.—During some twenty-five years of bird study in the field in Nova Scotia I have not found the Pine Warbler until this year, although I am familiar enough with the species during the breeding season in New England. On November 4th, 1922, I saw a small Warbler in a birch covert at Gaspereau, near Wolfville, N.S., and noticed that it was neither a Myrtle nor a Yellow Palm. At so late a date this was worthy of note and I decided to take the specimen. It proved to be a Pine Warbler (*Dendroica vigosii*). The bird was subsequently mounted and presented to the Provincial Museum at Halifax and constitutes a species new to the splendid collection of Nova Scotia birds there.—R. W. TUFTS.

FRESHWATER AMPHIPODS FROM CANADA AND NEWFOUNDLAND.—Since my note about this subject, in "The Canadian Field-Naturalist" for May, 1921, p. 99, I have been able to get a number of additional records for three of the half dozen species of freshwater amphipods occurring in Canada.

In addition to the records for *Gammarus limnæus* given on pp. 130-132 of "The Canadian

Field-Naturalist" for October, 1920, I have received from Dr. C. McLean Fraser of the University of British Columbia, Vancouver, a vial with many full grown and some new born specimens "collected by one of the university students in a small lake or pond on Botanie Reserve (near Kamloops), B.C., about a dozen miles from Spence's Bridge, at an elevation of 4000 feet." The collector states, "that the females were carrying the young under the flexed tail of the abdomen, and hence were unable to swim readily. To get over the difficulty they were hauled along backward by the males who grasped them with their anterior legs, and pulled them along quite readily." (July 6, 1922).

On my way from Gaspé to Newfoundland in the autumn of 1922, I stopped over at Charlottetown, Prince Edward Island; and in the freshwater lake in the west end of the town I secured, among the vegetation along the margin, a number (20) of specimens, from young to full grown, of *Gammarus* (*Dickerogammarus*) *fasciatus* Say, on August 22. The Amphipod was apparently very common in this lake; and its occurrence here is rather interesting, because hitherto it had not been collected anywhere else in Canada except in the Great Lakes area (see "*The Canadian Field-Naturalist*" for October, 1920, p. 129). These specimens from Prince Edward Island have been identified by Mr. C. R. Shoemaker of the U.S.N.M., who has also verified my identifications of the other freshwater amphipods mentioned in this note.

We now come to the new records for the third species, *Hyalella knickerbockeri* (*H. azteca*), in addition to those given in "*The Canadian Field-Naturalist*" for October, 1920, pp. 131-132; and for February, 1921, p. 36. When I visited St. Helier on the north coast of the Gaspé Peninsula (between St. Anne de Monts and Gaspé Basin, P.Q.) on August 15, 1922, I secured a dozen specimens (new born to half grown) of this species under stones in the shallow part of the outlet of Grant Etang Lakes, next to the old water-mill here. These are the first records from the part of Quebec Province lying south of the St. Lawrence.

In the footnote, p. 131 of "*The Canadian Field-Naturalist*" for October, 1920, I expressed the surmise that, owing to its occurrence on Cape Breton and the Magdalen Islands, *H. azteca* would probably be found to occur also on Newfoundland; and by visiting this island in the end of August and the beginning of September, 1922, I secured definite evidence of this. Thus 3 new born specimens and one half grown specimen were collected under stones in Burton's Pond, St. John's, on August 25; and a dozen specimens, from new born to half grown, on the same day among vegetation in the pond at the sand-pits outside St. John's;

and two days later 60 specimens, from new born to half grown, were secured by turning over stones at the margin of Quidi Vidi Lake, St. John's, near its outlet. Also 22 specimens of the same ages were collected in a swamp pond near Sugar Loaf Hill, north of (outside) St. John's on August 28. Finally two dozen specimens, from young to half grown, were secured in Rocky Brook, a stream emptying out into the west side of Grand Lake, near its north end, in the western part of Newfoundland, on August 31.

It will thus be seen that freshwater Amphipods are as common in the lands surrounding the Gulf of St. Lawrence as farther west in Canada; and we have now good reason to suppose that they also occur on Anticosti Island.—F. JOHANSEN.

A UNIQUE BIRD TRAGEDY.—During the past late summer and autumn months (1922), Pine Siskins have occurred in great abundance in Nova Scotia.

Some weeks ago I was driving by auto near Bedford (Halifax County) and at a point where there was elaborate road construction going on I was held up by one of the workmen who informed me that a dynamite charge was about to be fired. He pointed to a pile of brush about 150 yards down the road which was placed in the customary manner over the charge. As I waited I heard the familiar sweet notes of a rollicking flock of Pine Siskins. Glancing upward I saw them coming toward me, about thirty in number, and straight for the ominous brush-pile. At a height of about 60 feet they passed directly over it at the instant the charge went off and the air was filled with dust and bits of flying rock. The birds appeared to be literally swallowed up in it and as none were seen to emerge in any direction I believed that many if not all were killed.—R. W. TUFTS.

SOME NORTHERN RECORDS OF THE TURKEY VULTURE.

Mr. L. H. Cole, of the Mines Branch, Ottawa, took a specimen of the Turkey Vulture, *Calhates aura septentrionalis* at Dawson Bay, Lake Winnipegosis, Manitoba, on September 15, 1913. His excellent manuscript notes of the occurrence identify the bird beyond peradventure and include a life-size sketch of the head, as well as a sketch with measurements and colour notes of the dorsal aspect with wings spread.

In August, 1921, at Dauphin, Manitoba, Mr. P. A. Taverner and I were shown a photograph of a young bird from the nest. We were told by Mr. R. M. Watt, Forest Supervisor, Duck Mountain Forest Reserve, that the nesting had recently occurred in the Duck Mountains.

Mr. Alex Coxford, Superintendent of Elk Island National Park, Alberta, informed Mr. P. A. Taverner and me in September, 1920, that Turkey Vultures nested on an island in Lake Astotin in the summer of 1919. The nest was under a fallen tree, and fortunately Mr. Coxford had a photograph of the young bird which made the identification absolute. This nesting occurred at approximately 53°40' N. Lat.; 113° W. Long.; which, according to the records in the Victoria Memorial Museum, is the most northern breeding place yet recorded.—HOYES LLOYD.

A BELATED SWALLOW.—Friday, November 17th, 1922, was cold and wintry. The ground was whitened as the result of a recent snow flurry, and altogether it was decidedly cheerless. I was travelling by train from St. John, N.B., to Montreal and was impressed by the scarcity of wild bird life. Not even a funereal Crow in many miles to break the lifeless monotony of the landscape. Finally about nine o'clock in the morning we stopped and I noticed that the sign read "Birchton". I was told we were in Quebec. An open field lay between the train and some farm buildings 100 yards or so away. Suddenly my attention was arrested by a small bird flying slowly across the field. It sailed along leisurely with an occasional familiar wing movement and I saw that it was a Tree Swallow (*Iridoprocne bicolor*).

It disappeared behind the train and I eagerly watched, hoping it would return within range of my vision so that I might reassure myself. Presently it reappeared and this time passed my win-

dow within 40 yards and as it wheeled on several occasions I was able to note the pearly white breast which clearly distinguishes this from others of the Swallow family in eastern Canada.

On such occasions one naturally asks why should this frail bird have remained while others of its kind went south some two months or more ago? I believe it is true that the Tree Swallow is one of the hardiest of the Swallows. It has frequently been seen feeding on berries of various kinds, either from choice or when insects failed to abound in sufficient numbers to sustain it. Nevertheless it is essentially an insect-eater and is one of the first of our summer birds to leave for the south at the approach of autumn. Possibly this might have been an injured bird, hence unable to complete the long flight, though on the wing it showed no evidence of any physical defect. Might it not be that sometimes individuals among the birds reach maturity, lacking that marvellous sense which we call the "migration instinct"? Separated from their fellows, they linger aimlessly about their native haunts, eventually succumbing to the natural forces which apparently must soon destroy the frail bird I have described.

Since writing the above I have received a report from an observer in Port Mouton, Queen's County, N.S., under date of November 20th, 1922, which reads as follows: "... A Tree Swallow has been with us for some time and was last seen on Nov. 18th. Referring to my records covering the autumn migration of this species, I find that the first week in September is an average date for 'last seen'."—R. W. TUFTS.

It is expected that an exhibition of Canadian photographs of wild life, including both fauna and flora, will be gathered together at Ottawa before February 28, 1923, and will later be shown by those affiliated Societies that may desire to arrange to show it. Full information may be obtained from the Secretary of the Ottawa Field-Naturalists' Club.

BOOK REVIEW

CHECK LIST OF THE BIRDS OF ILLINOIS, together with a short list of 200 commoner birds and Allen's Key to Birds' Nests. Published by the Illinois Audubon Society, Chicago, 1922, Map, pp. 80. No author is given on the title page and we are informed the price is fifty cents.

THIS is a small octavo volume, with stiff cardboard covers, convenient for carrying in the pocket. The list of the two hundred birds is naturally an arbitrary one but is probably as satisfactory as any that could be made. It will probably be a convenience to the amateur

in keeping his attention focused on probabilities. The policy of reversing the sequence of species and beginning with the Thrushes instead of the Grebes, reverting to an obsolete system, is, to any one taking an active interest in modern ornithological literature, an exasperation rather than the assistance it is claimed to be.

The *Key to Birds' Nests*, by Dr. Arthur Allen, republished from "*Bird-Lore*," is an attempt to identify nests without knowledge of their owners. It is an interesting attempt and shows much field knowledge on the part of the author, but who wants to make records on such evidence? No word of caution is given as to its use and it can easily be imagined what a host of new breeding records may be given to Illinois when the enthusiasm that outruns experience begins to use it. Such a key may have value but is a direct encouragement to the hasty identification that is the prevailing weakness of the beginner.

The bulk of the brochure is taken up with a *Comprehensive List of the Birds of Illinois* prefaced by an introduction by Robert Ridgway that contains an interesting discussion of the life zones shown on the accompanying map, and some valuable facts regarding recent and past changes in the bird life of the state. It almost goes without saying that this section is absolutely satisfactory and authoritative. When it comes to the *Comprehensive List* itself we regret that we cannot say as much.

The fact that no scientific names are used is probably no objection in a popular work of this nature but giving subspecies the same prominence in treatment as full species without even trinomial nomenclature to distinguish the lesser facts from the greater cannot very well be defended. It certainly exalts the subspecies above its proper relative importance and leads the beginner out of his depth before he learns to swim. Surely no bird-man or woman to whom scientific names are stumbling blocks is competent to make the finer subspecific distinctions.

With all due regard to the popular nature of the list the annotations under the species are far from satisfactory, reflecting standards of thirty years ago rather than of to-day. The term "positive record" is used freely, but without further explanation it means little more than the similar expression, "Identification positive", did on the old egg labels. A great many old records are quoted without further comment than the authority's name. These names are great enough to com-

mand respect but the implied assumption that present day ornithological experts knew as much about birds in their youth as they do to-day is straining the probabilities. * Doubtless they themselves would be the first to urge caution in acceptance of many of these early records. In many cases too, there is nothing to suggest that they may represent an ancient order of things that has passed forever. Many species are noted, upon which further information is desirable. The Pomarine and Long-tailed Jaegers are given, but not the Parasitic; Great Black-backed Gull is inferred "not uncommon"; Laughing Gull, Gull-billed and Least Tern, Cinnamon Teal, Barrow's Golden-eye, Harlequin Duck, The Greater Snow Goose (given as "probably more numerous" than the Lesser), Cackling Goose, Brant, the Western Sandpiper (given as of regular occurrence), Western Goshawk and others occur in the list. Some of these records are probably correct, but others undoubtedly should not have been included without more careful investigation than is evident in the context. It is interesting to note that amongst the more generally familiar small land birds fewer surprises are evident.

It seems rather regrettable that at least a brief bibliography of the local field has not been included. A list of the principal works on the birds of the state would offer suggestions for side reading and additional information to the beginner and assist the more serious student in verifying or examining the evidence on some of the doubtful points.

It is an ungracious task to slate sincere enthusiasm but when enthusiasm takes up a difficult task it should be sincere enough to take it seriously. The making of a proper faunal list is an immense undertaking, how immense few realize, but unless well done it is better not done at all. Even, or perhaps, especially when it is planned for popular consumption, is accuracy necessary. The experienced ornithologist can often recognize loose work and guard against being misled by it but the amateur has no such safeguard of knowledge. If we leave out the question of accuracy for its own sake, and undoubtedly a popular work can be just as accurate within its scope as a scientific one, there is the question of example. The beginner can hardly be blamed for loose work when a low standard is set before him as a text book.

If this plain speaking suggests to others a realization of responsibility in work of this sort it will compensate for the pain it may incidentally cause the author of the work whom we otherwise esteem most highly.—P. A. T.





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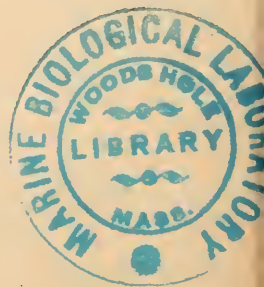
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Vol. XXXVI

OTTAWA, ONT.

February, 1922

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ISSUED APRIL 4TH, 1922

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Vol. XXXVI

OTTAWA, ONT.

April, 1922

The Canadian Field-Naturalist



Published by
The Ottawa Field-Naturalists' Club

ISSUED APRIL 28TH, 1922

(Entered at Ottawa Post Office as Second Class Matter)

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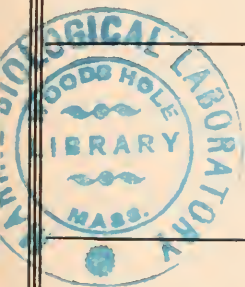
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ISSUED DECEMBER 4, 1922

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